

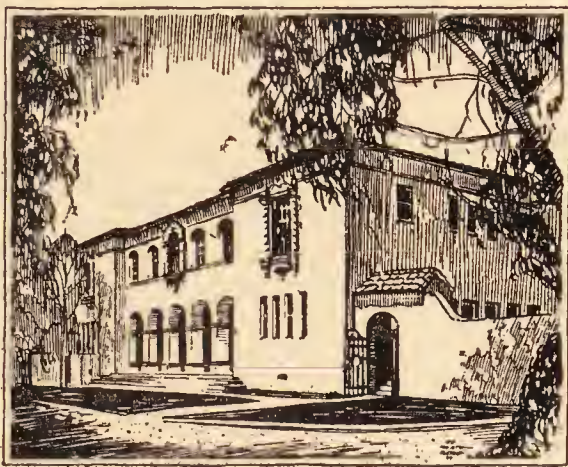
BULLETINS
OF THE
Zoological Society of San Diego

No. 13

**The Snakes of San Diego County
with Descriptions and Key**

By C. B. PERKINS

Herpetologist, Zoological Society of San Diego

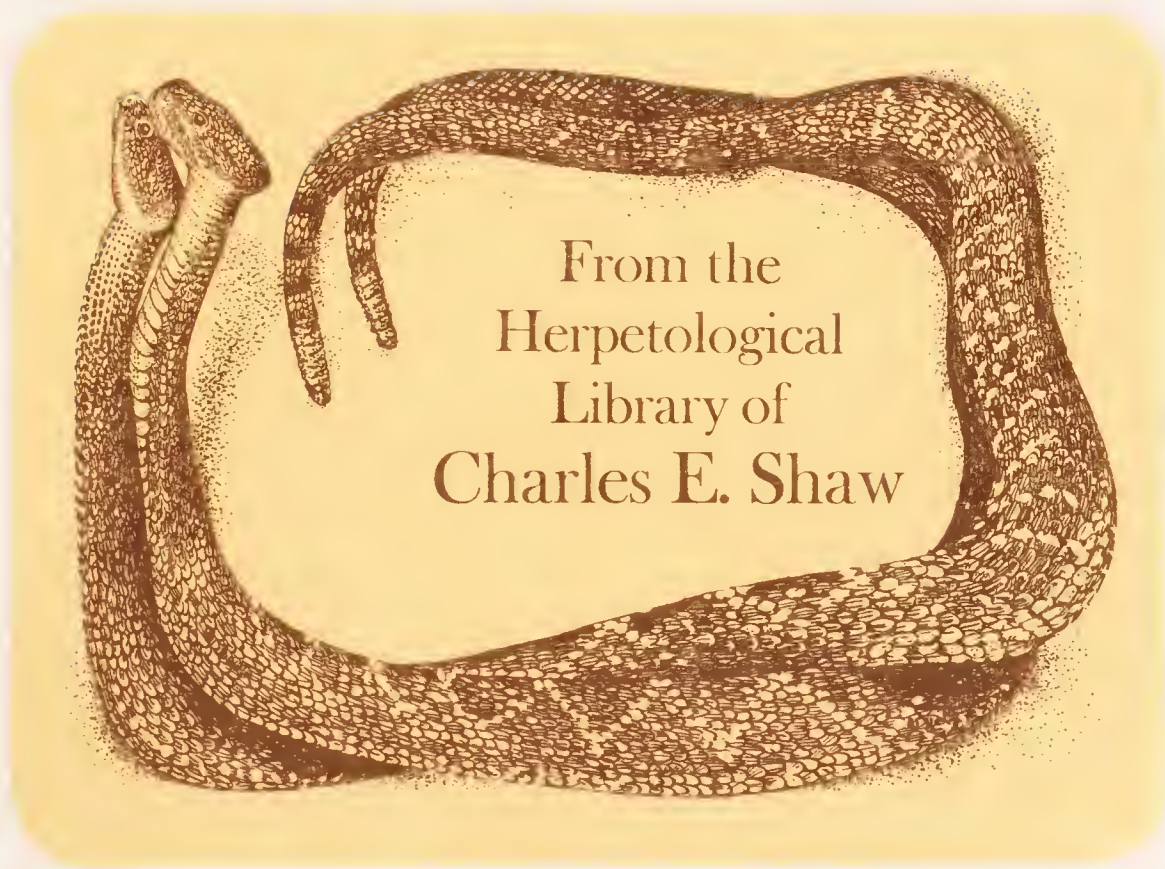


SAN DIEGO, CALIFORNIA
SEPTEMBER 6, 1938



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THE PURPOSE OF THE SOCIETY

1. To advance science and the scientific study of nature.
2. To foster and stimulate interest in the conservation of wild life.
3. To maintain a permanent Zoological Exhibit in San Diego.
4. To stimulate public interest in the building and the maintenance of a Zoological Hospital.
5. To provide for the delivery of lectures, exhibition of pictures and the publication of literature dealing with natural history and science.
6. To operate a society for the mutual benefit of its members for non-lucrative purposes.

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INTRODUCTION

A great deal has been written about snakes. Most of the information is highly technical and usually published in small pamphlet form, which the layman would not know how to obtain, nor would he want to spend the time laying the necessary foundation to understand the contents.

Several books have been published which are splendid for any beginner in Herpetology, but so much territory is covered and, of necessity, so much scientific data given that the layman is still unable to obtain usable information on the snakes of his locality.

It is the intention of this paper to give, with as little technical language as possible, such facts as the layman desires. The information is based to a great extent upon the answers to the large number of questions which have been asked at the Reptile House over a period of years.

It is hoped that any snake caught in San Diego County can be identified without question by the use of the Key, the limitations of which are mentioned on page 54. In most cases, however, identification should be a simple matter by using the illustrations and the text below them.

Mr. Robert S. Hoard took the splendid picture of the Black Whip Snake. Mr. Lewis Wayne Walker was behind the camera in the following cases: The Western Worm Snake and the Striped Ground Snake.

The rest of the photographs are the result of a great deal of work—and fun—on the part of my son, Cyrus S. Perkins.

For the excellent line drawings in the Key, I am indebted to Mr. Norman C. Bilderback.

No list of synonyms is given nor is there any defense of nomenclature, as these subjects are probably beyond the desire of the reader for whom this is written. However, the scientific name of each snake is given, as well as the most appropriate or generally used common one. As common names differ in different localities even in as small an area

as San Diego County, the only way to be sure of the identity of a snake is to know its scientific name.

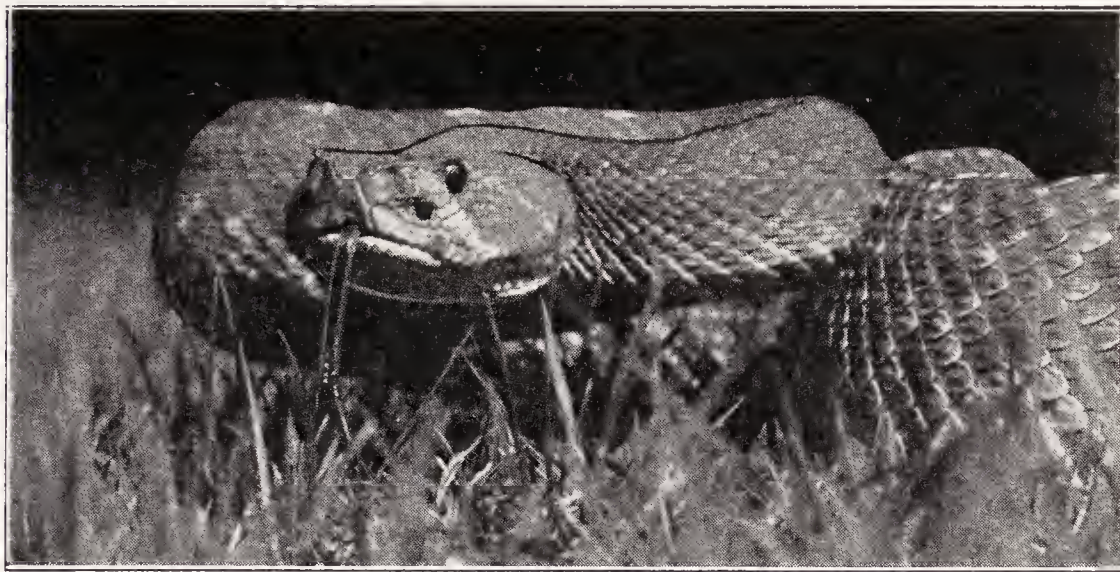
My thanks are due to Mr. L. M. Klauber for his patience in his critical reading of the manuscript.

That this paper should serve the purpose of making Man and Snakes better acquainted and possibly give the reader a desire for more knowledge on the subject of Herpetology is the wish of

C. B. PERKINS.

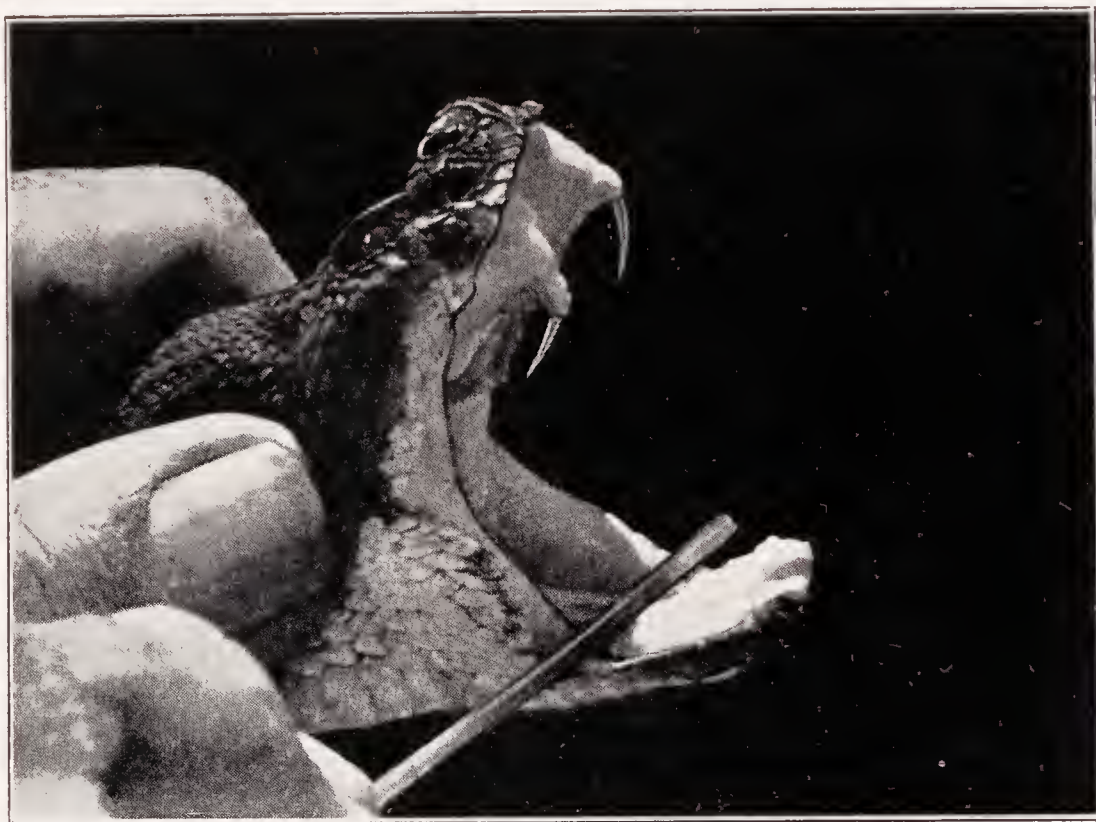
GENERAL INFORMATION

First of all, it must be realized that the rattlesnake is the only dangerous snake in California. Under ordinary circumstances the fact of the rattle is proof enough of the identity of the snake, but once in a long while the tail might have been cut off just above the rattle. Such an accident to the snake may have resulted from a horse stepping on the tail which was resting on a rock, or part of the tail may have been removed by a mowing machine, or the loss may have been due to any of a number of other causes. This would leave a blunt stump and if the tail is sharply pointed, it is not a rattlesnake. Regardless of how the accident happened, it removes the most easily recognized characteristic of our only dangerous snake, so we must have other means of safe and quick identification. This is most easily accomplished by a careful examination of the picture of a rattlesnake, or better still by observing the live specimens in the Reptile House.



Notice the shape of the head, the position of the eyes, and the deep pit situated below a line drawn from the eye to the nostril. These facial pits are highly nerved and are very sensitive to changes in temperature. The close approach of a warm blooded animal registers on the membrane of the pit and the snake will strike even though blindfolded.

The apparatus for injecting the venom of the rattlesnake into its prey, (which of course, is the main object of its having venom), is highly specialized. There are two long hollow teeth called fangs in the front of the upper jaw, one on each side, which fold back along the roof of the mouth when not in use.



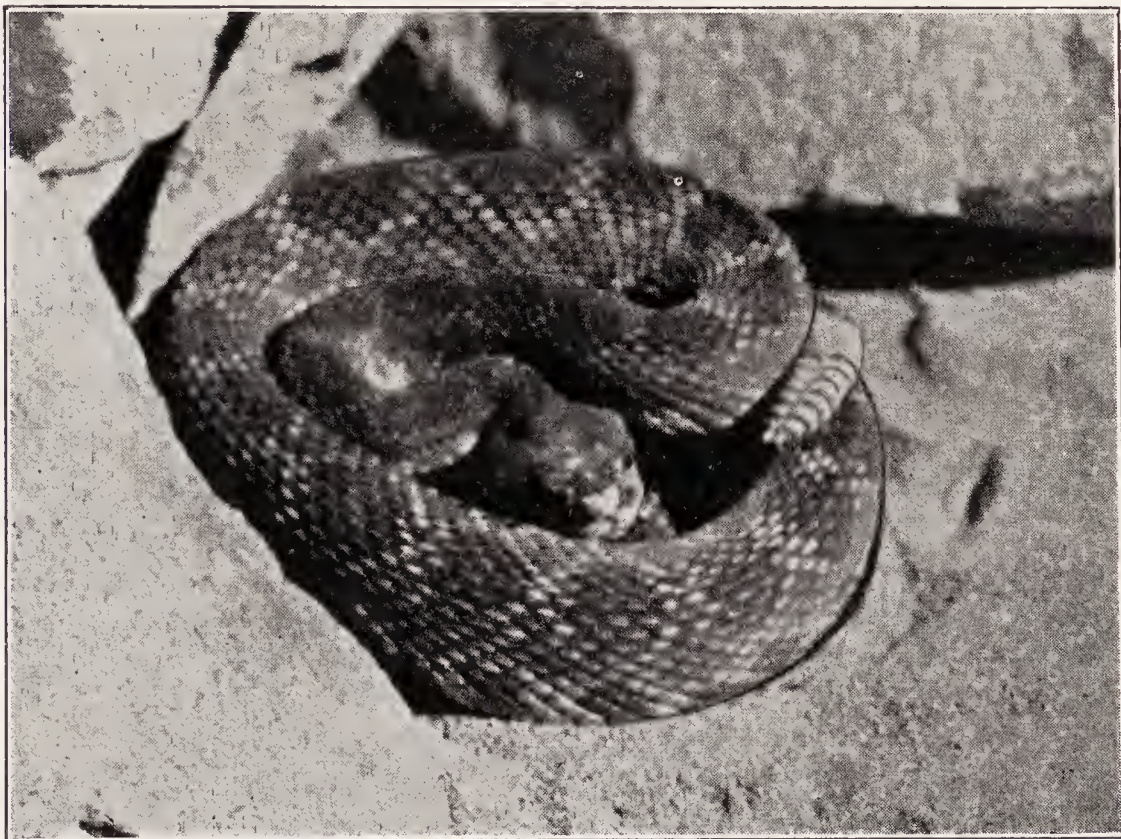
Showing the fangs in an erect position.

The fangs are covered with a sheath of non-muscular tissue which is pressed away from the point of the fangs by their entrance into the snake's victim. The basal end of each fang is connected by a duct to a poison gland behind the eye, and there is an oval opening in the lower front face just above the needle-like point—a perfect hypodermic syringe.

The tongue of all snakes is solely a sensory organ, combining taste and smell, and possibly but not probably a receiver for certain vibrations more or less corresponding to hearing, and has nothing to do with the biting nor the poison. An extended tongue moving slowly up and down covering a wide arc denotes a nervous rattler, and should be considered as much a warning as a buzzing rattle.

When striking an object, the mouth is opened wide, the fangs erected, the fangs driven in by a forward thrust or a bite, the venom injected, the fangs removed, the mouth closed and the head jerked back in a position of readiness for another strike—all this takes so short a time that the different movements cannot be seen.

The supply of venom is being renewed constantly, and the functional fangs are replaced every few weeks in the process of growth by new ones which lie above and behind them. A loose fang is usually swallowed with a meal and comes through the snake unchanged by the digestive juices although all that is left of a bird or mammal is feathers or fur. Often a fang is swallowed and evacuated when nothing is eaten. It is not uncommon to find a rattler with double fangs on one or both sides. Each fang may be a venom bearer. This occurs when the new fang has settled in place before the old functional fang has loosened in readiness to fall out.



A Pacific Rattler in a resting coil.



On the defensive.

When a snake is coiled, he is in a sleeping or resting position. In a defensive position, part of the body is more or less coiled on the ground, but the head and neck are raised up, generally in an S-shaped loop. A rattler can strike with accuracy as far as it can straighten out this loop, at most from a third to one-half of its length depending upon its position.

If a rattlesnake is heard, (the noise is very similar to that made by a cicada or the rattling sound of a dried weed which may have been kicked), the correct thing to do is to stand perfectly still, as a rattler seldom will strike anything but a moving object. This permits the snake to be located. It is said that people have been bitten by jumping toward instead of away from the snake.

All rattlesnakes are born alive (not hatched from eggs) and have poison glands and functional fangs at birth. A few days after being born they shed the skin; the horny end of



Mexican Rattlesnakes (*Crotalus basiliscus*) less than two hours old.

the tail, called the pre-button, comes off with the old skin. From then on, no segments of the rattle are shed.

It is impossible to tell with any degree of accuracy the age of a rattlesnake by the number of rattles. A new segment is added to the rattle each time the snake sheds its skin, which is three to five times a year in San Diego County, depending upon the length of time the snake hibernates, the amount of food eaten, etc. Usually a number of segments on an adult snake have been broken or worn off.

There are forty different species and subspecies of rattlesnakes—all in the Western hemisphere. Twenty-six of these are found in the United States with San Diego County represented by five. One or more of these five rattlers is found everywhere in the county from the ocean itself to the mountain peaks and down into the desert.

The rattlesnake is really an economically valuable and therefore a beneficial snake, as the food of most species con-

sists almost entirely of harmful rodents; but due to the fact that it can cause death, it should be killed when found near dwellings, picnic grounds, etc., where human life might be endangered.

In these days of cheap transportation and the natural desire to camp out or at least picnic in out of the way places, a great many people endanger their lives unnecessarily. More than 90% of snake bites occur between the hand and elbow, or foot and knee. The obvious thing to do is to see where the hands and feet are placed. The legs should be protected with boots or puttees. Great care should be exercised when picking flowers, climbing rocks, turning over stones, etc. Avoid the rattlesnake, but know what to do in case of an accident.

TREATMENT OF RATTLESNAKE BITE

In case of snake-bite, make sure that the snake was a rattler and not a harmless snake.

Do not get excited. Do not be afraid. Do not run nor in any way speed up the circulation. The danger depends upon a great many factors—condition, size and species of the snake—whether bitten by one or two fangs—whether the snake has recently used up part of his supply of venom—the part of the body bitten—the rapidity of absorption—the amount of venom compared to the weight of the patient, etc. Few cases of rattlesnake bite are fatal, even without treatment.

Next apply a tourniquet between the bite and the heart. If the bite is on a finger, use two tourniquets, one between the bite and the hand, and the other on the arm. The tourniquet should be tight enough to stop the lymph canals and the flow of blood to the heart, but not tight enough to stop the arterial supply of blood. Rubber tubing makes the best tourniquet, but a stocking, necktie or belt will do, and a shoestring is always available.

If Mulford's Nearctic Crotalidæ Antivenin, manufactured by Sharpe & Dohme, is available, use it. More than one ampule may be necessary. Follow the simple directions contained in the box. Do not confuse this serum with any other

remedy. This serum is made from the blood of immunized horses and as some people are sensitive to any horse serum it would be best to see a doctor and get a sensitivity test before going into snake infested country.

Now make an incision in the form of an X over each fang mark to the estimated depth of the fang puncture. Connect the two incisions if it can be done without cutting across ligaments, large veins or arteries.

It is very important that both the razor blade or knife as well as the surface of the bitten part should be sterilized. This can be done, for example, with iodine, mercurochrome, alcohol or whiskey. If none is available, hold the blade in the flame of a match, and do not wipe off the soot.

The tourniquet should be gently loosened every ten minutes for several seconds.

Now comes the really important part. SUCTION SHOULD BE APPLIED AND CONTINUED FOR AT LEAST HALF AN HOUR, after which time the tourniquet should be removed. Should the swelling or discoloration progress, more cross incisions $\frac{1}{4} \times \frac{1}{4}$ inch must be made at the end of the swelling and suction applied there, replacing the tourniquet an inch above the swelling. Suction should be applied for half of each hour as long as swelling continues or until the patient is in the hands of a doctor.

There is no danger in getting the venom in the mouth or stomach. It must get into the blood to be harmful. However, it might be dangerous to suck if cracked lips, ulcerated teeth, or stomach ulcers were present. If the person bitten happens to be alone and the bite occurs on some part of the body that cannot be reached by the mouth, some mechanical aid is needed. There is a cupping device manufactured by the Flack Mfg. Co. of San Antonio, Texas, called the "Dudley Kit," that can be used instead of sucking. In my opinion, it is the best kit on the market. Carry it with you. It has instructions for you and also for your doctor who, by the way, should be on the lookout for a neurotoxic effect which usually occurs (if at all) about 36 hours after the bite.

ALWAYS CUT AND SUCK WHETHER ANTIVENIN IS USED OR NOT. It is much more important to get the venom out of the system than to try to neutralize it after it has gotten in. Get a doctor as soon as possible, preferably one who has had other snake-bite cases, but get a doctor.

The following quotation is from a letter from Dr. Dudley Jackson, who probably has treated more rattlesnake cases than any other physician in the world: "One of the most valuable things to do is to insist on a doctor typing the patient and matching his blood to prepare for a blood transfusion, for this is one of the most valuable agents we have in treating severe snake bites. This procedure takes time and should be done in every case, and if the necessity of a blood transfusion arises it can be given before the patient dies. I have seen two cases die before suitable donors could be found. Both cases were apparently mild at first." The above instructions are not for you but for your doctor.

If permanganate of potassium is available, make a wine colored solution to rinse the mouth between suckings, and USE IT FOR NO OTHER PURPOSE. Do not put it on the wound, as a weak solution will not destroy rattlesnake venom and a strong solution will destroy human tissue.

Wet dressings (a hot saturated solution of Epsom salts is best) should be placed on the wound to assist in drainage after the cutting and sucking is finished, while awaiting a doctor. Do not burn the wound with a hot iron, acids, or anything else, as this cauterizes the wound and stops the most important thing—drainage.

Do not use any whiskey. Alcohol in any form speeds up the circulation, sending the venom more rapidly through the system (exactly what is NOT wanted) and later, when a stimulant may be needed, alcohol (especially in large doses) is a strong depressant. Instead, give a cup of strong coffee or a teaspoonful of aromatic spirits of ammonia in a glass of water, if the patient has a weak pulse or feels like fainting.

Regardless of what stories may have been heard concerning cures for snake-bite, such as dead chickens placed on the bite, tobacco juice, gunpowder, or any other home remedies,

follow the above directions, as they represent the best treatment known. ALWAYS CUT AND SUCK.

The above advice in case of rattlesnake bite is summed up as follows:

DON'T

Don't run or get excited.

Don't take any alcoholic drinks.

Don't use permanganate of potassium on the wound.

Don't cauterize the wound.

Don't try any "home remedies."

DO THIS

Be calm. There is little danger if proper first aid is given.

Place a tourniquet between the wound and the heart, and loosen it every ten minutes for a few seconds.

Use Mulford's Nearctic Antivenin according to directions.

Cut with a sterile blade and suck for at least a half hour.

Get a doctor as soon as possible.

Always cut and suck.

*There is one back-fanged snake in San Diego County. Although poisonous, it is not at all dangerous. The poison is mild, (too weak to kill a mouse), the fangs are grooved (not hollow), are situated in the back of the upper jaw, and are too small to puncture the skin. This snake is so rare that it is seldom seen, except by collectors who are seeking it. It is the California Lyre Snake (*Trimorphodon vandenburghi*).*

Some of the harmless snakes bite. A Red Racer will almost always bite, even when handled gently, whereas a California Boa will not, even when handled roughly. The bite of course is absolutely harmless. It startles more than it hurts. The wound is comparable to several pin pricks or scratches, and the same precaution should be used as is advisable whenever the skin is broken. A little iodine or mercurochrome, and it's well tomorrow. I do not believe it is possible to be bitten by a harmless snake unless the snake is handled.



Gopher Snake eggs hatching.

Some snakes are hatched from eggs (oviparous) as is the case with the King Snake and Gopher Snake, and some are born alive (viviparous), coming in nice little "cellophane wrappers," as the Rattlers and Garter Snakes. In neither case does the mother have anything further to do with the young.

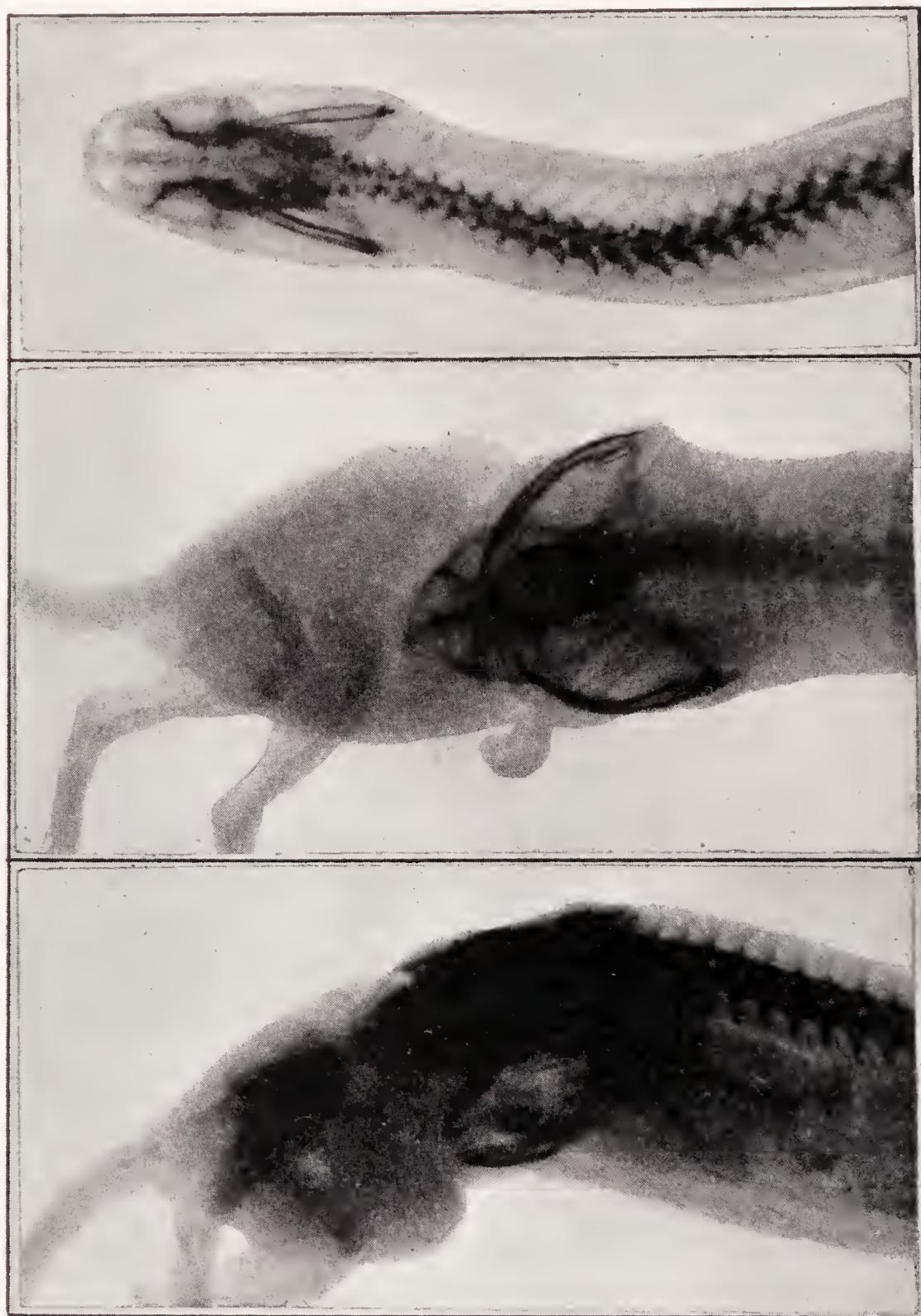
Snakes shed their skins to allow for growth and incidentally to take care of wounds, sores, etc. In shedding, the snake loosens the old skin from the upper and lower lips by rubbing against stones, plants or on the ground, and crawls out, turning the old skin wrong side out, like pulling off a stocking from the top. Even the scales covering the eyes are shed. Sometime before this takes place, the old skin becomes loosened from the new skin, and eyes appear opaque blue. An oil comes between the two skins and in about ten days or less, the eyes clear up to their natural color and a few days later, the skin is shed as described above. This takes place several times a year.



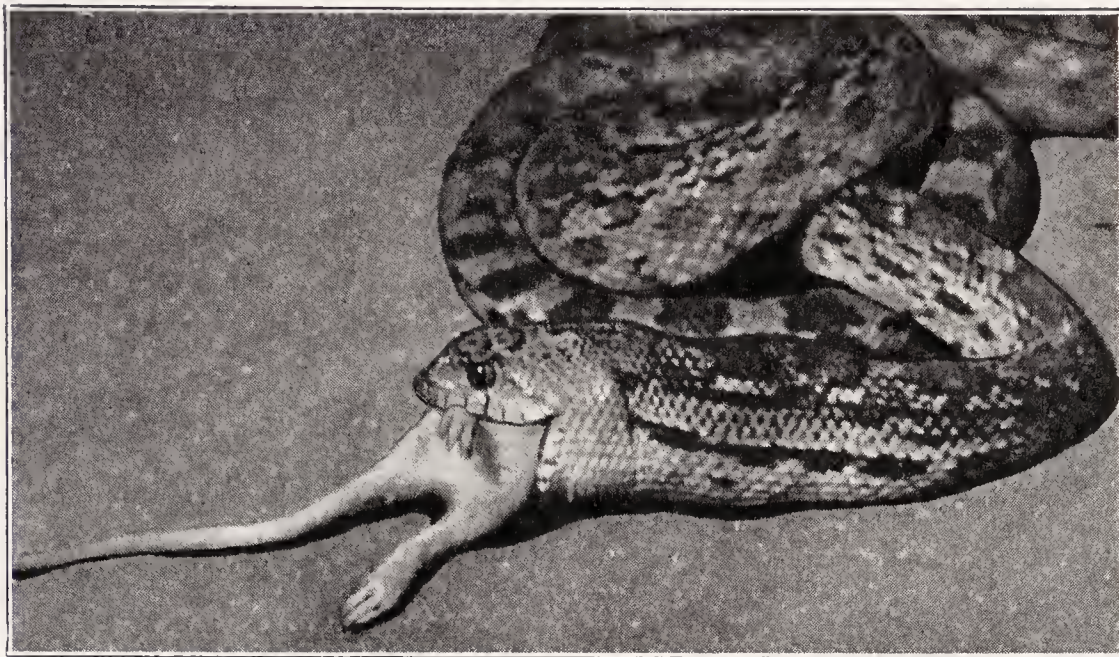
This King Snake did not do a very good job of shedding—probably he was camera-shy.

Food of Snakes. Some lizards and turtles are vegetarians but no snake eats anything but animal food. A few have very specialized diets. There is an African snake (*Dasypeltis scabra*) that eats nothing but eggs. The King Cobra confines his food to snakes. The Sea Serpents take nothing but fish. Some snakes eat insects only but most snakes eat several different things. In the Reptile House rats are used more than any other one thing; however mice, rabbits, frogs, snakes, lizards, chickens, fish, meat, insects and earthworms must be available as most of them are used each week. In the Descriptions of the Snakes the food habits will be mentioned.

Snakes kill their prey in five different ways. Some by constriction, that is by wrapping around and squeezing to death; a good example is the Gopher Snake. Some kill by holding the prey in the mouth and pressing it down on the ground with a single loop of the body—the method used by the Racer. The Rattler strikes its prey and releasing it, waits until it dies from the effects of the venom. The back-fanged



The top picture shows the snake head in normal position taken from above. The middle picture is also from above showing a mouse being swallowed. The bottom picture is taken from the side. The bones of the head are loosely jointed but the jaws are not dislocated while swallowing as is commonly supposed. These X rays were taken by Dr. L. F. Conti at the Zoo Hospital.



A Gopher Snake swallowing a rat.

snake bites and holds on, working the food back to the poison fangs with a chewing motion and holds it there until dead. The Garter Snake grabs its frog from any angle and starts to swallow, depending upon suffocation and its gastric juices to kill it. Usually the food is swallowed head first, but this is not always so. Pet snakes will often take their food either end first, depending on how it is offered them, and many snakes will do likewise if the food is much smaller than that usually taken.

Lizards do not come within the scope of this paper, but it seems necessary to mention one of them.

The Silvery Legless Lizard (*Anniella pulchra*), because of having no legs, is sometimes mistaken for a small snake. No snake has eyelids but most lizards do, including this one. Snakes have an elastic cartilage connecting the two halves of the lower jaw, whereas in a lizard the two lower jaw bones are connected, forming a chin. This is the real difference between a snake and a lizard. The Silvery Legless Lizard is subterranean and fairly common in sandy soil. Its color above is yellowish white or silvery with one distinct narrow brown line down the middle of the back and one or more along the



Anniella pulchra. A lizard—not a snake.

sides. Its belly is yellowish but sometimes grayish or bluish under the head and tail.

Snake stories should be taken with more than a grain of salt. There seems to be no animal about which there is so much misinformation.

No snake in the United States will attack a person; but on the contrary, unless cornered, will try to get away. The size of snakes is usually greatly exaggerated. Snakes do not roll like a hoop—nor milk cows—nor swallow their young for protection—nor whip people—nor chase people—nor has any snake a poisonous breath—the tongue is harmless—no snake has a sting.

There are all kinds of stories about the danger of having anything to do with any kind of snake except to kill it at sight. This is, of course, ridiculous. I do not believe the fear of snakes is inherited, but rather handed down through stories and example from generation to generation. Snakes

are beautifully colored, extremely graceful, are not slimy, and are probably the cleanest of all animals.

The California Boa, California King, the Garter Snakes, Mountain King, and Yellow-bellied Racer are found over a period of years in greater quantity in June than any other month. All of the others are most plentiful in April or May. However, occasionally, snakes of most species are found every month of the year. Although they hibernate, several warm days in succession will bring a few out.

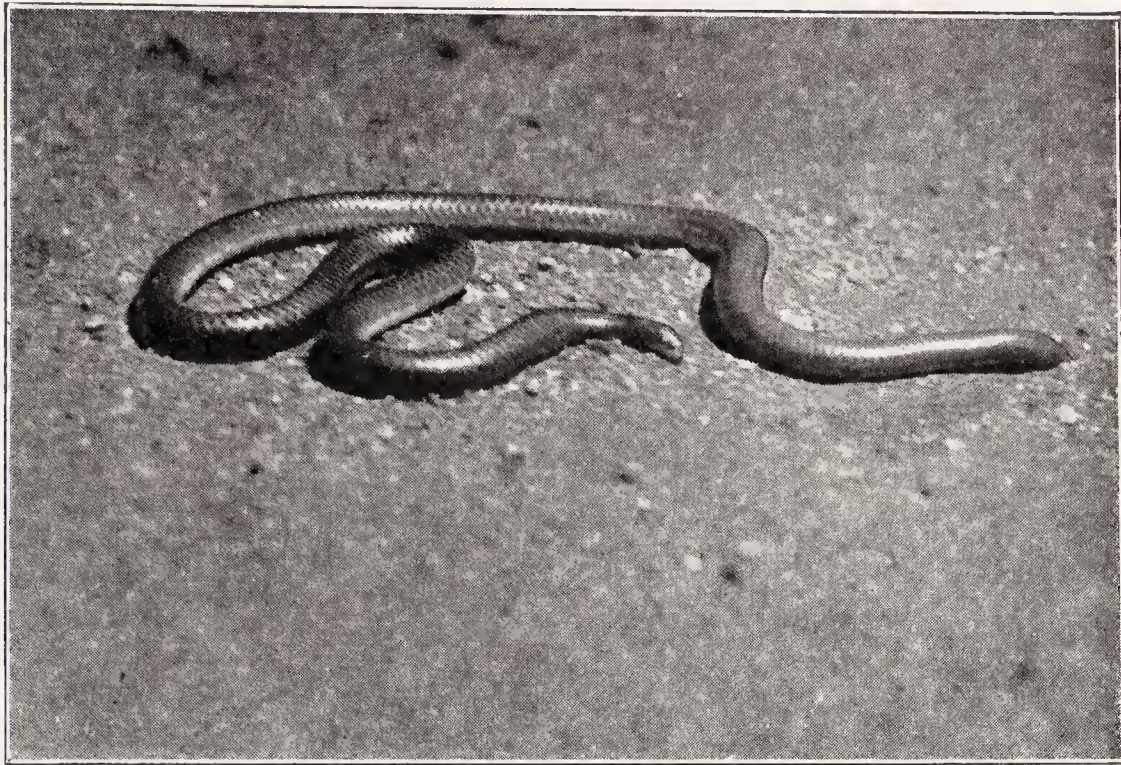
Let me emphasize the fact that there is only one dangerous snake in California, the rattlesnake. All the rest are harmless and most of them beneficial. Most of them live to a great extent upon the harmful rodents that eat so much of the farmers' grain. No harmless snake should be killed; the Gopher Snake and probably others should be protected by law. Several farmers have told me that every Gopher Snake found on the road is taken home and placed in their fields.

DESCRIPTION OF THE SNAKES OF SAN DIEGO COUNTY

The following facts, when known or deemed necessary, will be given regarding each of the thirty snakes found in San Diego County: Food habits—habitat—with what other snakes the one in question might be confused—whether born alive or hatched from eggs—size—shape of eye pupil.

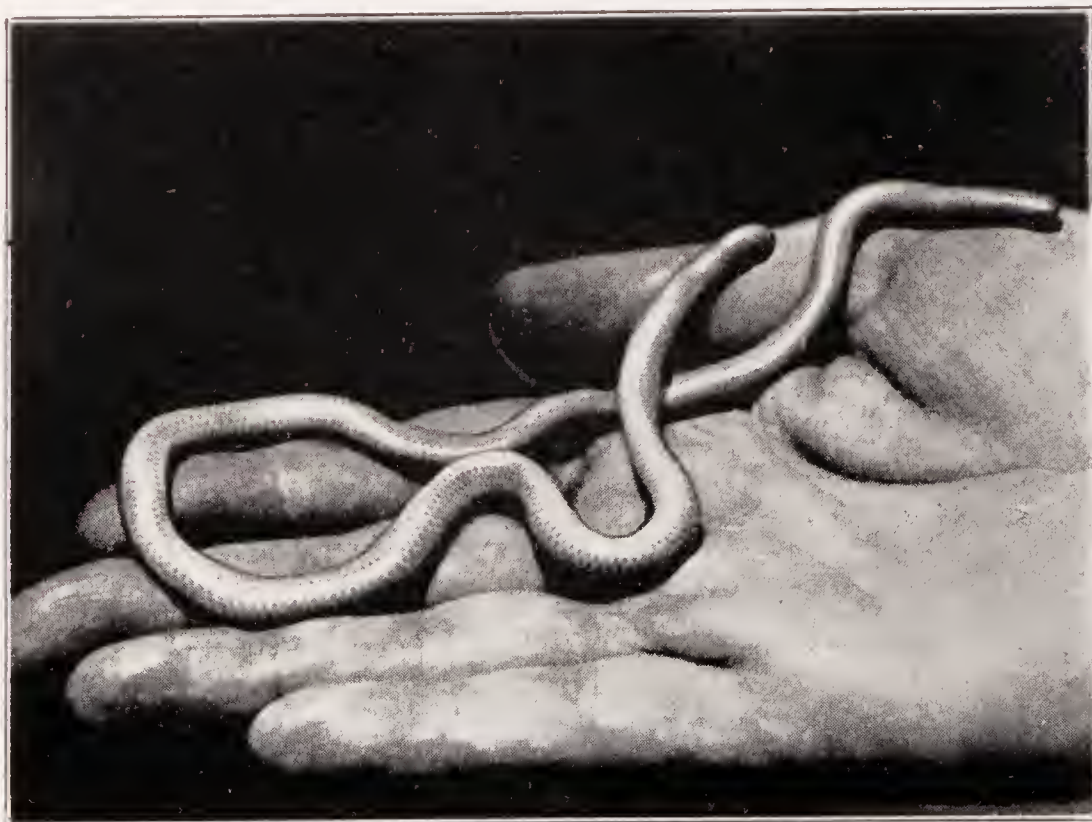
The most common ten snakes are referred to as "common," the next five as "moderately common," the next five as "moderately rare," and the remainder as "rare."

In reading about any snake it is advisable to read what is said about other snakes of the same genus (those having the same scientific first name), as space does not permit giving under each heading, facts that are common to all.



WESTERN WORM SNAKE
Leptotyphlops humilis humilis

This little snake looks like a long polished earth-worm. Its upper surface consists of seven dark brown scale rows. Underneath it is a very light pink. It has a blunt tail with a small spine at the tip with which it appears to help push itself along. The entire body is covered with scales of the same size, without large transverse belly plates (called scutes) such as are found in the other snakes of San Diego County except its close relative the Desert Worm Snake. The head is small and the eyes almost invisible. It is subterranean, being found under rocks and among the roots of bushes from the coast to the edge of the desert. A large specimen was brought to the Reptile House a few years ago that had been found ten feet above the ground in a date palm in the dirt and decayed wood between a sawed off leaf and the trunk. A great many are dug out in the process of constructing new roads, and although the teeth, which are found only in the lower jaw, could not possibly break the skin, some strong man with a shovel protects his life by cutting the "dragon" into several pieces. Its food seems to consist of soft-bodied grubs, termites, and perhaps young slender salamanders. An average-sized specimen is about nine inches long, and a quarter of an inch in diameter. The record for size seems to be $13\frac{1}{4}$ inches. The smallest I ever saw was about 4 inches long and smaller than a safety match in diameter. It was coming into the old Reptile House under the back door. The Worm Snake is sometimes confused with the Legless Lizard (*Anniella pulchra*) but, as the lizard is striped and the snake is not, there is no excuse for a mix up.



DESERT WORM SNAKE
Leptotyphlops humilis cabuila

This snake differs from the preceding subspecies in having five rows of light brown instead of seven rows of dark brown scales on the back. It is a much lighter snake in every way, being almost transparent. It is found in the desert from the foot of the range eastward. Specimens are occasionally captured in Borego Desert on the road at night. At present it is one of the rare snakes of San Diego County. Its food habits are, presumably, similar to those of the Western Worm Snake. Both of the worm snakes lay eggs. There seems to be no difference in size between the two subspecies—nine or ten inches being average length.

The San Diego Zoo is always glad to get reptiles of any kind but especially specimens of the rarer species, and will greatly appreciate any small snakes from the desert.

For some unknown reason there is a popular belief (which is erroneous) that there are a great many deadly snakes that are extremely small and the tiny defenseless worm snakes are often so considered. There is a little spine at the tip of the tail with which the snake seems to try to push himself along and should the snake be held in one's hand this spine can be felt as the snake tries to get away. This is sometimes referred to as a sting. No snake has a sting and the few snakes that use this spine-like tail-end to push with are absolutely harmless. In the case of the worm snakes, the poor little fellows have teeth in the lower jaw only. These teeth are almost microscopic and could not possibly puncture the most tender skin and to top it off, the snake never attempts to bite.

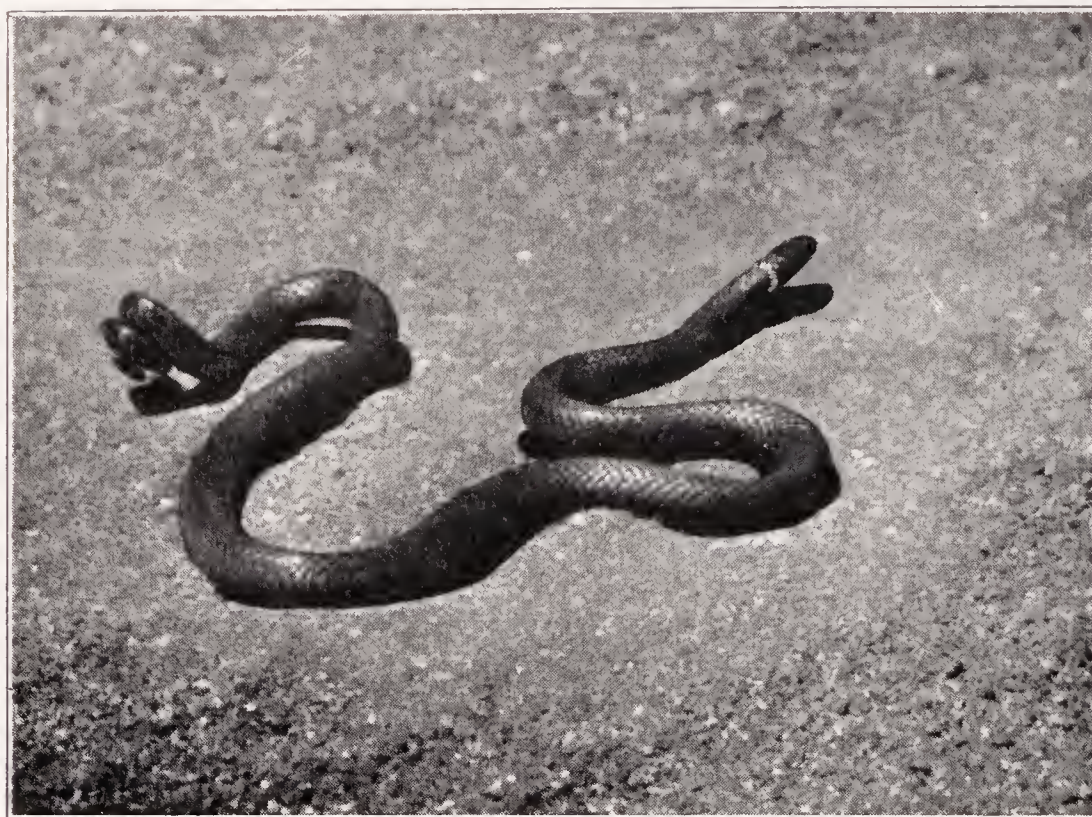


CALIFORNIA BOA

Lichanura roseofusca roseofusca

This small representative of the large boas of the American tropics is the mildest tempered snake in San Diego County. It never attempts to bite. It has a small head with small scales on the top instead of the usual large plates of most snakes. Its eye has an elliptical pupil. It may grow to a length of three feet, although most specimens are smaller. It is common and found in the chaparral and among the boulders from the ocean to the desert. Its food consists of birds and mice, and it seems to prefer smaller animals in proportion to its size than other snakes. The young, usually six to ten, are born alive. For some reason, in most of the larger specimens the glands in the tail are swollen, so that the head and stump-like tail are about the same size, for which reason it is sometimes called the Two-headed Snake. It is also called Rosy Boa. There is a spur, or sometimes merely an enlarged scale on each side of the anal plate, representing legs in a bygone age.

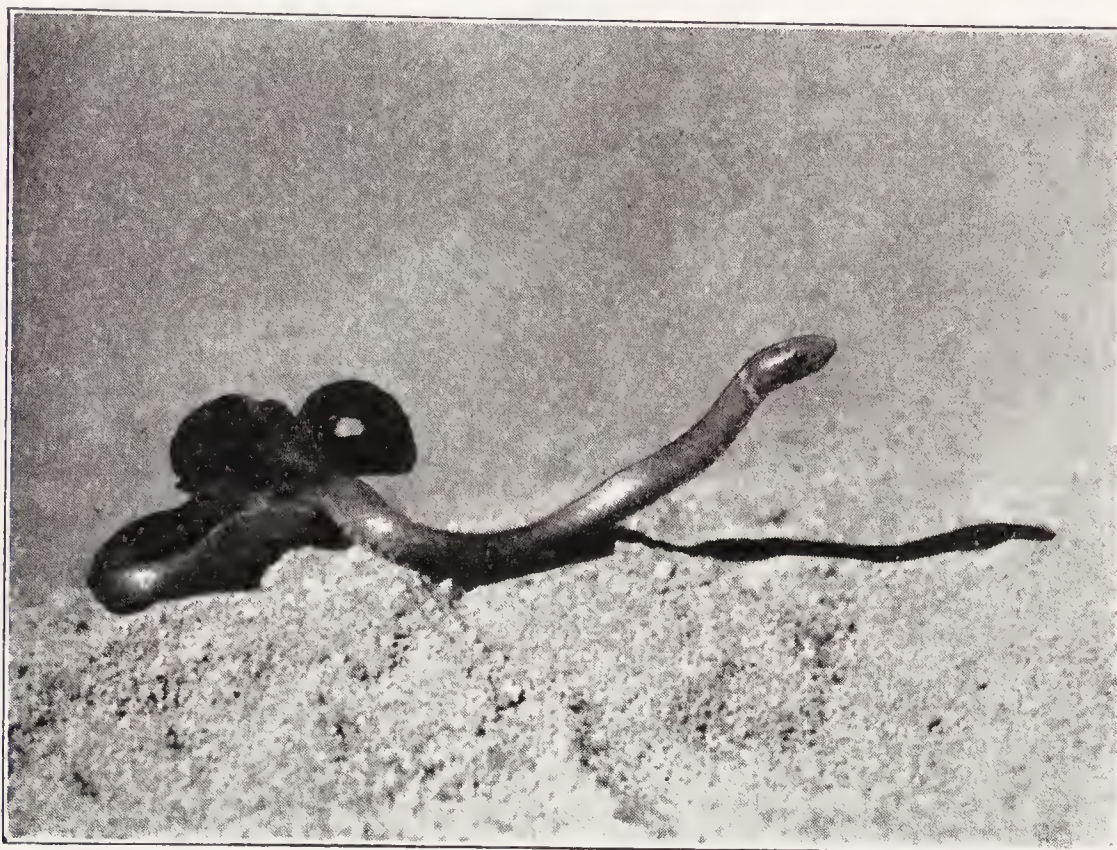
The color above is grayish or brownish, with three more or less indistinct reddish wavy lines down the back and sides. Its under color is lighter than the top, spotted with brown or gray. Some have the peculiar habit of rolling up into a ball when roughly handled. It is a slow moving snake and easily captured. Although as a species this boa is not a good feeder, some individuals do very well in captivity, taking mice from the fingers. It kills its prey by constriction. Although reported to have been captured during heavy rain storms, it does not seem to be especially interested in the water in its cage except for an occasional drink.



SAN DIEGAN RING-NECK SNAKE

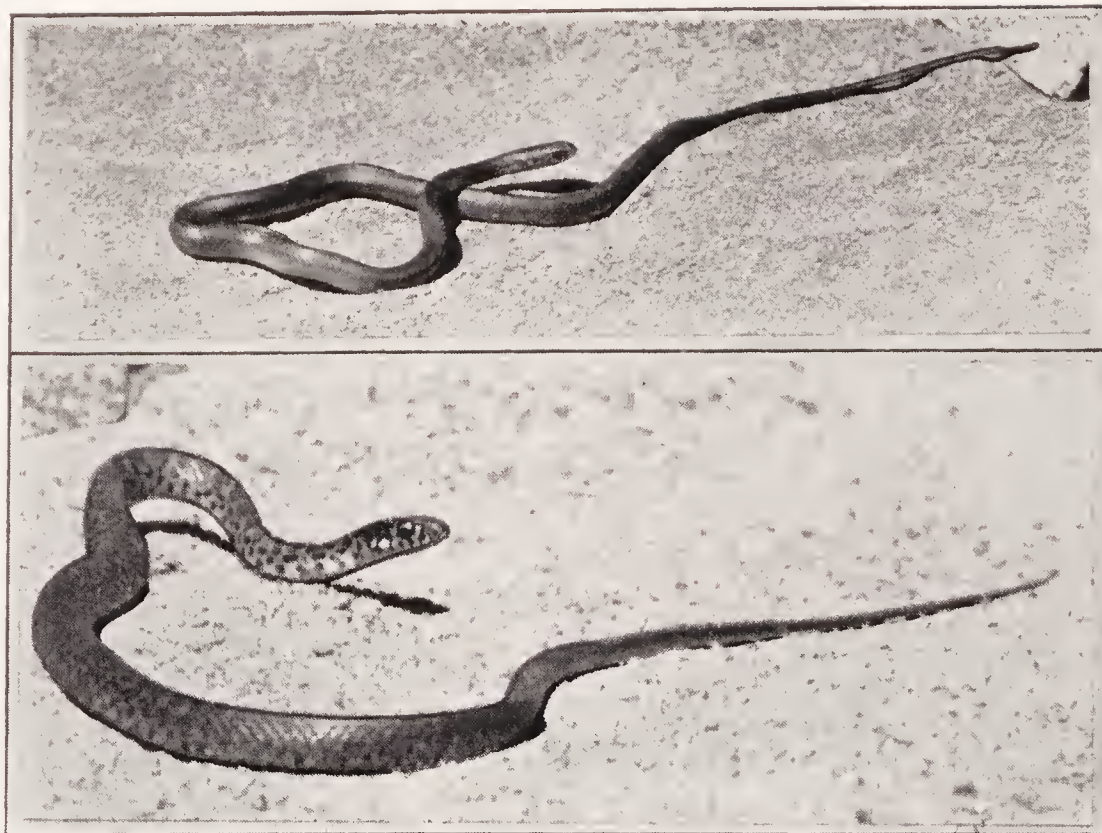
Diadophis amabilis similis

The body of this small snake is slate or greenish gray above with a bright orange collar separating it from the darker head. Its under surface is yellow or orange with numerous black dots, and the under-tail is red. It might be confused with the California Black-headed Snake which is small and has a collar, but can be distinguished easily as the Black-headed Snake has a spotless, pinkish belly and under-tail. Most specimens of Ring-neck are brought to the Reptile House from the gardens of San Diego, although it is common throughout the county from the ocean to the mountains, in moist places under rocks, boards, etc. About a foot is the usual length of large specimens, although very rarely one half again as large is found. Several years ago a tourist described a snake about twenty inches long which could not be identified from his description. When he later brought it in, it turned out to be a Ring-neck. Unfortunately he would not leave this giant with us. While looking at the snake it disgorged a large skink which although full grown had made no noticeable "bump" in the snake's body. The food of the Ring-neck consists of earthworms, salamanders, lizards, tree frogs and grubs. When alarmed, this defenseless snake twists its tail into a spiral and holding it up an inch or so, displays the red under surface of the tail, apparently in an endeavor to frighten away whatever danger exists. The pupil of the eye is round. The baby snakes hatch from eggs. Because they are usually found by digging, Ring-necks are brought to the Reptile House every month of the year, although March, April and May rank highest.



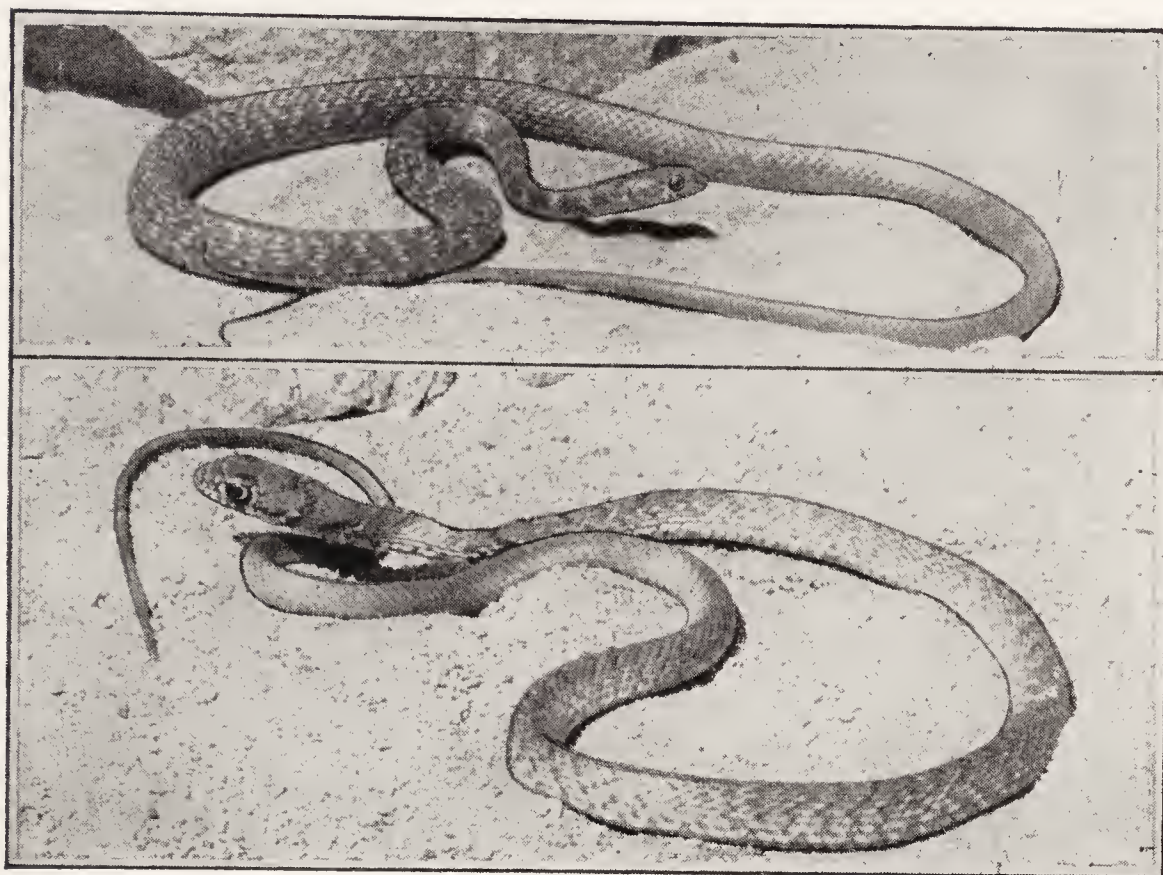
LOS ANGELES RING-NECK SNAKE
Diadophis amabilis modestus

This snake is so similar to the San Diegan Ring-neck that it would be hard to tell which was which without the use of a special key. Except for one specimen taken at San Onofre, the Los Angeles Ring-neck is unknown in this county. However, undoubtedly, there will be more records as more ring-neck snakes are taken at the northern edge of San Diego County. The snake is common enough farther north. It will average a little larger than the San Diegan Ring-neck and the yellow on the sides has a tendency to be more prominent. The number of scales across the back is usually greater than in the local form. There are several different species of ring-neck throughout the United States and the food of all is similar. Very little is known about the breeding habits of our ring-necks but a great deal of work has been done on the eggs and nests of the Eastern Ring-neck. In the case of that snake, the eggs are laid in decaying logs that are exposed to the sun. Although the females lay an average of three or four eggs apiece, there are records of as many as ten from one snake. It is an interesting fact that several females will pick the same hollow and lay their eggs in one large group. As many as forty-eight eggs have been found in one nest. These nests are used year after year. Large snakes lay more eggs than small ones but when there are more eggs they are not as long as the eggs of the smaller females with fewer eggs. Snake eggs found in their natural nests will often hatch if placed in almost any container surrounded by the material in which they were found and kept at room temperature. Eggs laid in captivity are much more difficult to care for, and considerable experience is usually needed for satisfactory results.



WESTERN YELLOW-BELLIED RACER
Coluber constrictor mormon

This is a close relative of the Blue Racer of the Middle West. Its back is olive or greenish brown, and its belly yellow with no markings on either surface. It is occasionally confused with the Southern California Garter Snake, but can be distinguished without trouble as some pattern is always present on the garter snake no matter how old or how badly it needs shedding. Also notice the illustrations of the heads of the two snakes. The Yellow-bellied Racer is moderately rare from the ocean to the desert foothills, preferring the open moist meadows or the brush-covered land adjoining them. It often suns itself stretched out on the top of a bush, and, if disturbed, glides away with what seems to be race-horse speed. On three occasions a specimen of this racer was captured under the same feed box in a pasture near Ramona. All of the racers are nervous snakes, biting at the least provocation, but the Yellow-bellied seems to be the best tempered of the four found in San Diego County. Its food consists principally of tree frogs, crickets, and the young of small rodents. It is one of the few insect eating snakes. Some specimens take lizards. A three-foot snake is large. The young (lower picture), which are hatched from eggs, are grayish with spots and blotches of brown. For this reason the young of this snake appears in a different place from the adult in the Key. Any snake with which it might be confused will not have the typical racer head with the large eyes. This racer does not do well in captivity and, as its looks are not especially striking, is seldom displayed in the Reptile House.



RED RACER

Coluber flagellum frenatum

This snake is not always red. Almost any color will do—grayish, light yellow, dark yellow, brownish, or reddish. Often the scales are light on the edges with dark tips. There are several whitish bands across the neck and head which is usually dark brown or black. The under-parts are usually yellow with numerous spots of yellow, brown, or black on the lighter throat. The young (lower picture), which are hatched from eggs, are grayish—blotched or barred across the back with brown. The Red Racer is moderately common from the ocean to the desert in rough fields or brush and is often found in dry creek beds. It climbs well and probably adds birds' eggs to its bill of fare which includes birds, small mammals and lizards. I believe it is the fastest snake in San Diego County. With its slim body and long tapering tail it "flows" over the ground or through the brush with what seems to be an amazing speed. There are records of Red Racers six feet long, but four and a half to five feet is to be considered a large snake. The pupil of the eye is round as is the case with all the racers. In my opinion the Red Racer is the most vicious snake in this county. It is so fast, that catching it means a sprint with no hesitation at turns, which are sometimes right-angled ones, with possibly a dive at the finish. When the snake is caught it immediately starts to bite, and continues until it is safely in the snake-sack. Some specimens will bite even after weeks in captivity. To be fair to the snake, however, a few individuals are captured without an attempt to bite.



BLACK WHIP SNAKE

Coluber piceus

The color above is solid black and the belly light yellow. Nothing is known of the coloration of the young of this snake. The scalation, size and habits are so similar to those of the Red Racer that at one time it was considered merely a melanistic phase of that snake. It is extremely rare in San Diego County, and presumably will be found only along the Southern border as it is common enough above Ensenada in Lower California. I believe that in this county only two live specimens have been captured and three dead ones found on the road. All five specimens were taken along the Southern border. One has been reported several times just north of the Mexican border near Tijuana, but so far has eluded capture. Its food habits are like those of the Red Racer which grasps its prey and holds or pushes it down on the ground, with a loop of the body, until dead. It is surprising how rapidly a large-sized mouse is killed in this fashion; certainly it takes less time than is used by the constrictors. It then starts to swallow its prey, usually head first, as is the case with most snakes. Sometimes, however, this is not true, especially when the food is small. Very tame snakes of many species will swallow a dead mouse or rat either end first. This is true of some of the Boa Constrictors and other snakes now in the Reptile House.

The Black Whip Snake is extremely nervous and does not do well in captivity. Some specimens eat well for a time but most individuals steadily refuse food. All of the racers being so active need food more often than most other snakes and are fed every four or five days while living in the Reptile House.



CALIFORNIA STRIPED RACER
Coluber lateralis

This snake is the most common of the San Diego County racers and in my experience, the hardest to catch. I do not believe it is as fast as the Red Racer, but it is usually found in the brush, and it's there one moment and gone the next. As some one has cleverly said: when only a part of the body is seen between two roots of a chaparral, there seems to be no motion, the stripes merely get closer together, the snake gets smaller in size, and then isn't there.

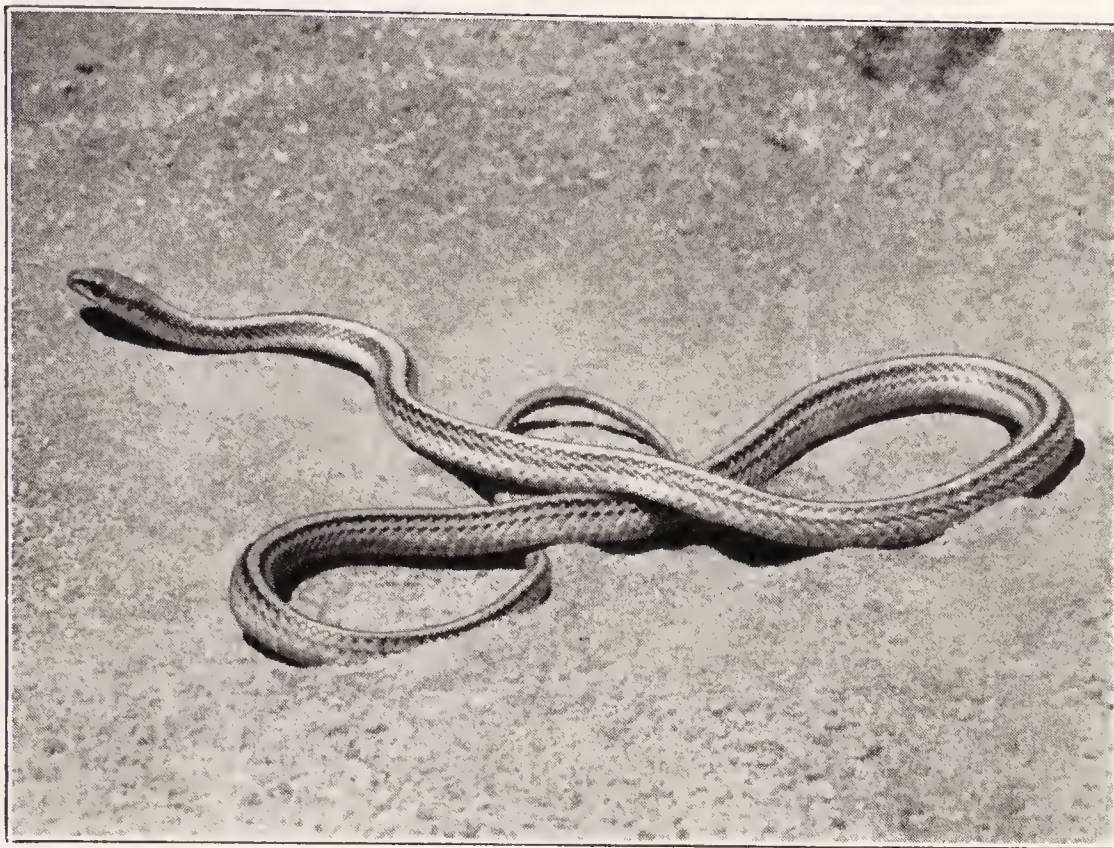
The color above is dark brown, purplish or blackish, with a yellow or white line extending rather high along each side. The belly is yellow; the under-tail a beautiful pink. Four and a half feet is a good-sized specimen. Its food consists of birds, small mammals, lizards and snakes, though it seems to prefer lizards. The Striped Racer has the peculiar habit of holding the head rigid (parallel to and a few inches above the ground) and moving five or six inches of neck sideways back and forth in a waving motion. The young are striped like the parents, and are hatched from eggs. Last year's young are often found under boards, logs, etc., in likely places early in April. It is impossible to get this snake confused with any other species, because any other snake with stripes on the sides does not have the typical racer head. It is common throughout the county from the ocean to the mountains, especially in the chaparral. This snake does not do very well in a cage. In fact, none of the racers is suited to a life in captivity. They are too nervous and often injure their noses rubbing against the wire or glass.



CHAPARRAL PATCH-NOSED SNAKE

Salvadora grahamiae virgulata

The Patch-nosed snake is well named as his rostral plate is very large, recurved on top, with the lateral edges free, giving a very patch-like appearance. The top color is usually brown or brownish black, with a tan stripe extending down the middle of the back. Between the brown of the back and the yellow of the belly, there are a few rows of light yellowish-brown scales which sometimes give the appearance of side stripes. Usually, however, this color is the same as the belly, or nearly so, so that no side stripes are apparent. Although much larger snakes are reported, two and a half feet is average length for a good-sized specimen. The eye is large with a round pupil. The Patch-nosed Snake is closely related to the racers. It is moderately common from the ocean to the desert, usually in the brush. Lizards seem to be its principal food; at least I have been unable to get it to eat anything else in captivity. It is an egg laying snake. It might be possible to get this snake confused with the California Striped King Snake, but the differences are obvious. The nose of this snake is nothing like that of the other. There is no dark on the under-parts of the Patch-nosed, whereas the under-tail of the Striped King is always dark. Another snake with which it might be confused is the Pacific Garter Snake—because they both have a stripe down the middle of the back—but the patch on the nose of this snake is like no other and is its most readily noted distinguishing characteristic.

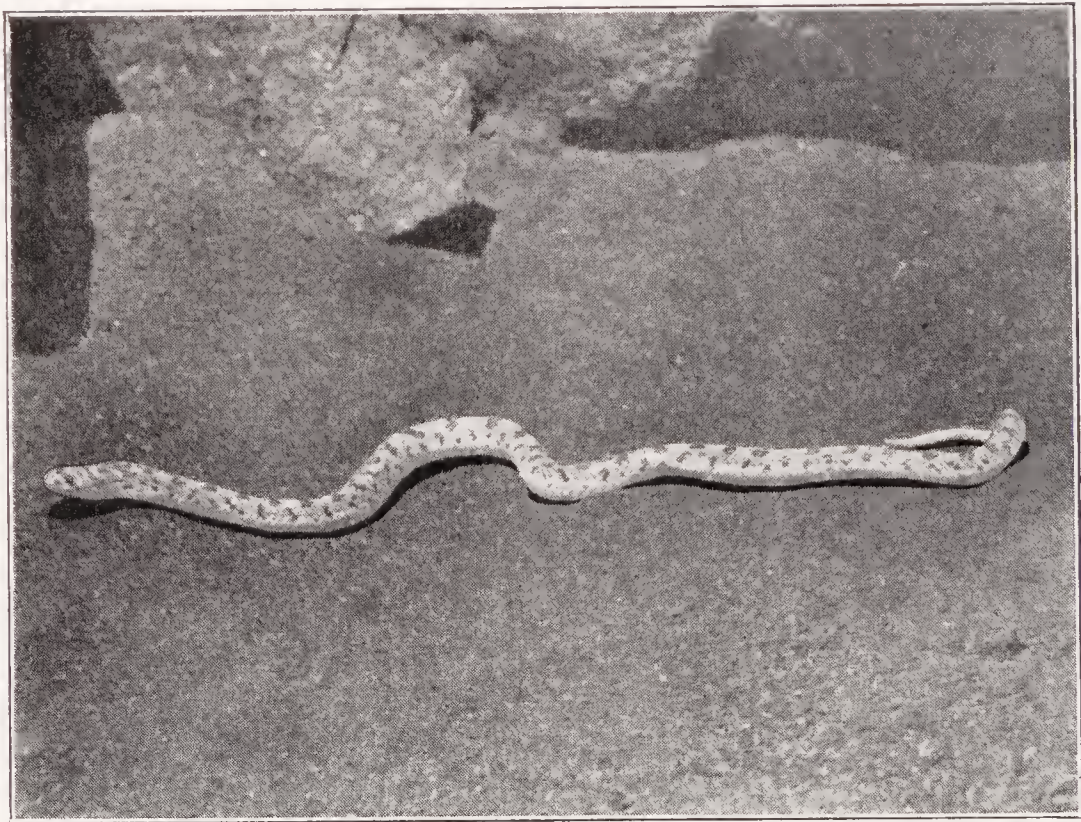


DESERT PATCH-NOSED SNAKE

Salvadora grahamiae hexalepis

This snake is the desert form of the Genus *Salvadora*. It is very similar in appearance to the coastal form but is distinguished at once by the greater width of the light stripe running down the back. Not only is this stripe wider but lighter as well and the darker adjacent stripes being narrower give a decidedly lighter appearance to this subspecies. There is no difference in size between the two subspecies, two and a half feet being average length for a good sized specimen. Their habits are similar. Both are alert, speedy snakes, watching intently a hand moving slowly toward them but seldom attempting to bite. One of the most common lizards on the desert is the gecko (*Coleonyx variegatus*), a nocturnal lizard about 4 inches long. This lizard is eaten by several of the desert snakes and seems to be the principal food of the Desert Patch-nose.

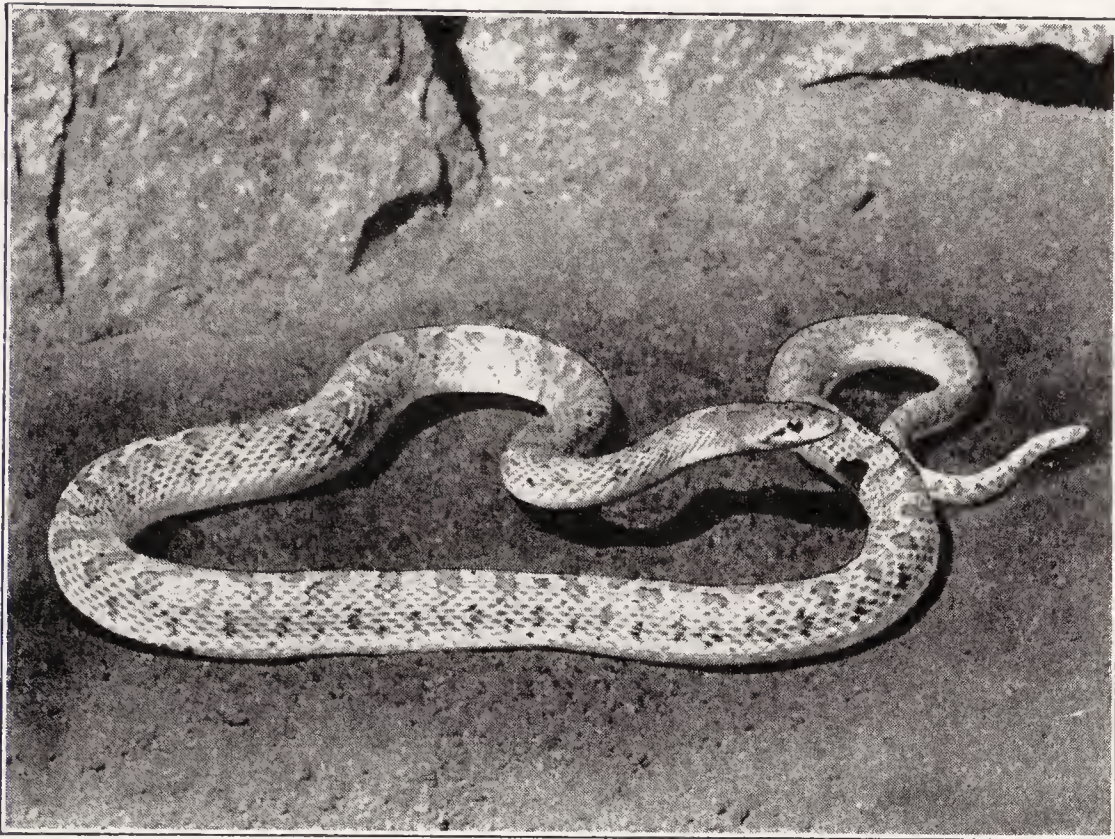
In the description of the various snakes a request is often made to bring reptiles to the San Diego Zoo. The same request is repeated here. The Patch-nose Snakes lay eggs and it has been said that the embryos are further advanced when the eggs are laid than is the case with most snake eggs. It is possible that we might be able to learn something concerning this if we could get some pregnant females. Egg hatching in captivity is a hazardous undertaking at best but a great many things of interest to the science of herpetology can be learned this way, and we are constantly working along these lines.



LEAF-NOSED SNAKE

Phyllorhynchus decurtatus perkinsi

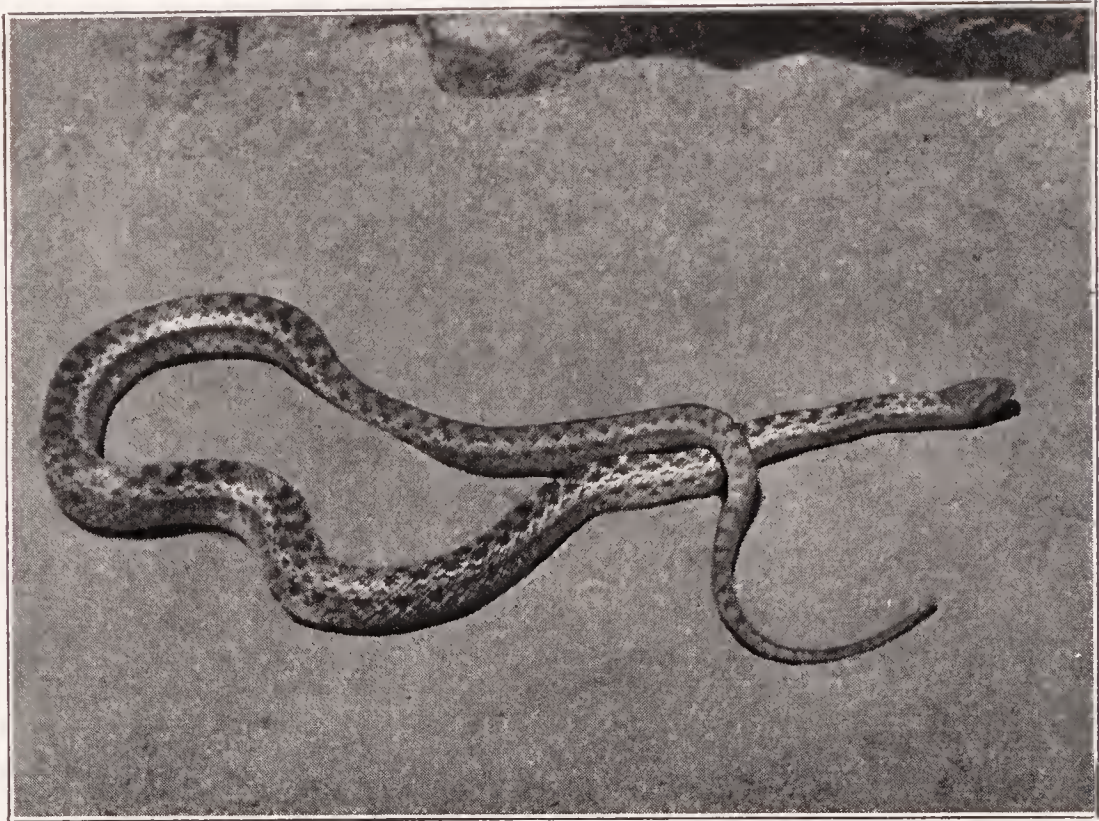
The first word of the scientific name of this snake (*Phyllorhynchus*), which is Greek, is literally translated "leaf nose," which is its common name. Some specimens have smooth scales throughout, and others have faintly keeled scales at least toward the tail. This little snake, seldom more than twelve inches in length, is whitish above with small brown blotches on the back, and one or two rows of brown spots on the sides. The belly is white without markings. The nose-plate is very much enlarged with free lateral edges. It has a large eye, in proportion to its size, with an elliptical pupil. This is one of the common snakes of the desert and is nocturnal. Until a few years ago, it was believed to be extremely rare, only four specimens having been taken in this County from January, 1923, to December, 1930. Now, however, with the paved road in Borego Valley, and the technique of night collecting, more than four are often taken during one night's hunting. The word "rare" can be used with two distinct meanings. There may be few snakes of a given species in a certain locality, and therefore the snake is rare; or few snakes may be collected, due to faulty technique in collecting, inaccessibility of location, etc., making the snake appear rare. This probably is true of many of our so-called rare snakes. The Leaf-nosed Snake feeds upon insect larvæ, small lizards and their eggs. Small specimens jerk off and eat gecko tails. Nothing seems to be known of its breeding habits except that the young are hatched from eggs. When annoyed it puffs out its throat vertically, apparently with the intention of looking formidable, but with such a little snake the valiant gesture is merely ridiculous.



WESTERN GLOSSY SNAKE

Arizona elegans occidentalis

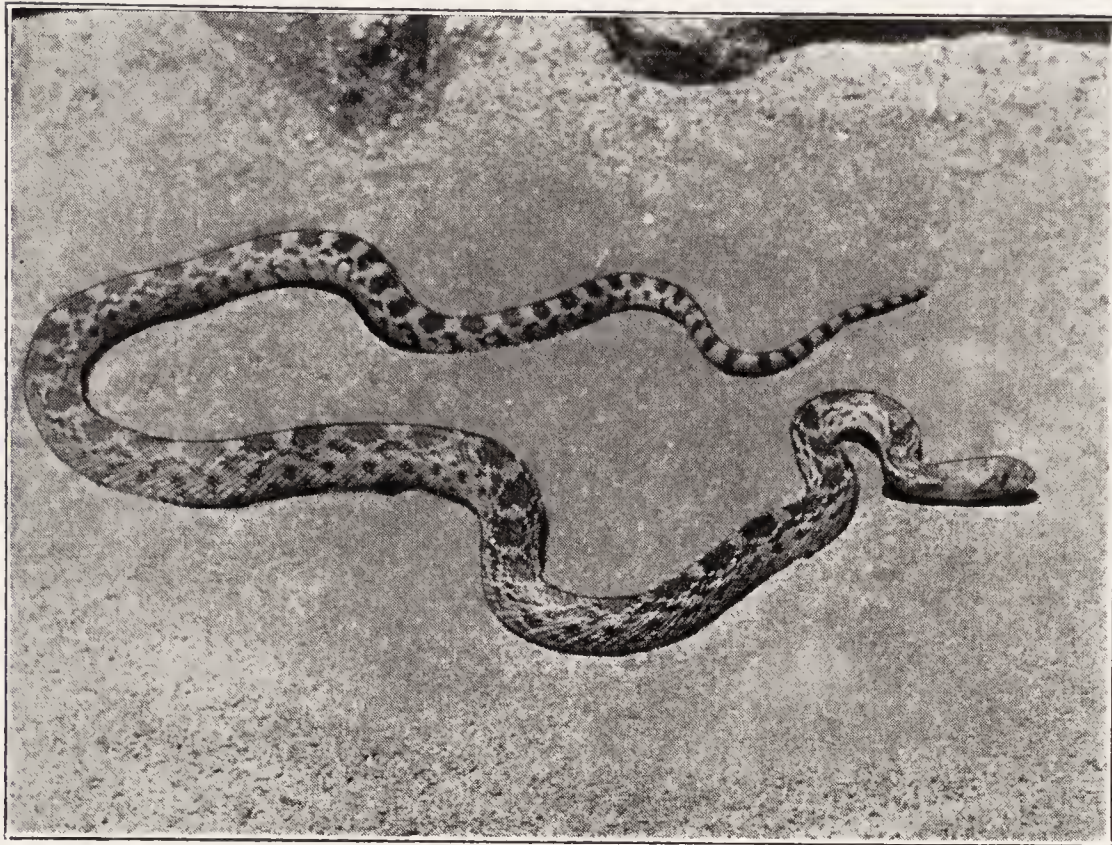
This moderately rare snake, a large specimen of which would be about three feet long, is found from the ocean to the desert. It seems to be more plentiful on the desert, however, where it is captured from dusk on into the night. The upper parts are grayish yellow or cream with brown blotches edged with darker brown down the middle of the back. A series of similarly colored spots usually run along each side, alternating with the blotches on the back. As is so often the case, any snake that is found both on the desert and elsewhere is much lighter in coloration in the desert form. As mentioned above, the Glossy Snake is found on the coastal side of the mountains as well as on the desert. The ground color of the coastal form is much darker and the blotches are darker still but both forms are obviously the same snake. The belly is solid white. The pupil of the eye is round. This snake is often confused with the common Gopher Snake, but can be immediately distinguished by its smooth scales, those of the Gopher Snake being rough or keeled. This is another of the snakes most often caught while crossing the desert roads at night. As one drives slowly along, the Western Glossy Snake appears a moving white line in the beam of the headlights. When alarmed, its movements are more like the frantic wriggings of the Garter Snake than the easy flowing motion of the racers. It is gentle and does not attempt to bite. In captivity it eats lizards, but (for me, at least) refuses mice, seeming to be afraid even of small ones.



SAN DIEGAN GOPHER SNAKE

Pituophis catenifer annectens

This is the most common snake in San Diego County, being found from the ocean to the desert foothills, and also the most beneficial snake in killing mice, rats and other rodents that eat so much grain. Above, this snake is yellowish with a series of blotches of black or dark brown down the middle of the back, with another alternating series of blotches along each side, sometimes giving the appearance of a dark snake with yellow markings. Often the ground-color of the tail is reddish. There seem to be three distinct patterns on the back, the first third being mostly black, the rest of the body yellowish with dark blotches, and the tail yellow or reddish with dark bands. The under-parts are yellow or orange with dark spots on the edges of some of the belly plates. Specimens six feet long are reported, but four and a half feet is a large specimen. In June or July the female lays from a dozen to twenty eggs which hatch about two months later. There is a sounding-board flap of skin in the mouth of the Gopher Snake which makes possible a very loud hiss when the snake expels its breath. If the snake is picked up at once when found, it usually will not bite, and after a few moments will be content to be held, but if there is any delay in capturing it, the snake usually tries to bluff its way out. It makes great lunges and hisses very loudly, biting at the first opportunity.



DESERT GOPHER SNAKE

Pituophis catenifer deserticola

The preceding snake is the most common in San Diego County, whereas this is one of the rarest, although common in Imperial County. It is confused with its near relative the San Diegan Gopher Snake, but is much lighter in color and never has the bright red on the tail which is sometimes found on the tail of its San Diego cousin. The average number of blotches on the upper surface of the San Diegan Gopher Snake is about 95, while this snake averages about 70. Also, this is a desert snake and is not to be expected elsewhere. The Desert Gopher Snake, as well as most other desert snakes, prefers for its hunting the evening or night rather than the brilliance of day. Its food habits are probably the same as the common Gopher Snake, although in captivity it seems to prefer smaller rodents than the latter. It is not usually taken on the bare desert, but rather in the more bushy places. This snake has the same sounding-board in the mouth (permitting it to make loud hisses) that is present in the mouths of all snakes of the genus *Pituophis*. For this reason the Gopher Snake is sometimes called "Blow Snake" and "Bull Snake." Both names are very appropriate. It vibrates its tail rapidly when annoyed and if the tail happens to be in dry leaves, a sound is made somewhat like that of a rattlesnake. This vibrating of the tail is a common habit with several other genera of snakes, notably the King Snakes (*Lampropeltis*) as far as this county is concerned.



CALIFORNIA STRIPED KING SNAKE
Lampropeltis getulus californiae

This snake and the following one are pattern phases of the same snake. This one is common from the ocean to the desert foothills, usually in the brush. The color above varies with individuals from light brown, dark brown, purplish, to almost black. Down the middle of the back is a narrow line of yellowish or whitish and sometimes just above the belly on each side is a line of light spots. Often the back line is broken into short lines or dashes. The under-parts may be of the same light color as above, or mottled or mostly dark, but always the under-tail is dark. Very rarely a specimen is found having a stripe (or dashes) part way down the back, and the rest banded like the succeeding snake, (Pacific Banded King Snake). A snake of this description would not, of course, be found by using the Key. Most of the King Snakes eat other snakes, often longer than themselves, as well as lizards, rodents, and occasionally birds. It apparently is immune to the venom of the rattlesnake, and eats rattlers as well as harmless snakes. It is not true however, that a King Snake will go out of its way to kill a rattler. It is a very powerful constrictor and squeezes its victim to death, wrapping its whole body if necessary around the other snake in tight coils. Although four foot specimens of the Striped King are sometimes found, the usual length is about three feet. It lays eggs which take about seven weeks to hatch. I do not believe it could be confused with any other back-striped snake, as the dark under-tail would identify it.



PACIFIC BANDED KING SNAKE

Lampropeltis getulus californica

This and the preceding one are pattern phases of the same snake. This beautiful snake, also called Boyle's King Snake, is common, being found from the ocean to the desert, often in the brush in the neighborhood of streams. The colors are the same as the preceding snake, being brown, dark brown, purplish, or almost black with yellowish or whitish markings, but the pattern is in cross-bands instead of a stripe. The light cross-bands are fairly narrow on the back, but become broader on the sides. The food habits of this snake and the striped phase are the same. All King Snakes lay eggs, have eyes with round pupils, and are fairly thick in body with short tails; there is very little constriction at the neck. With all their ferocity toward other snakes, King Snakes are usually very gentle as far as man is concerned, seldom biting even when freshly captured.

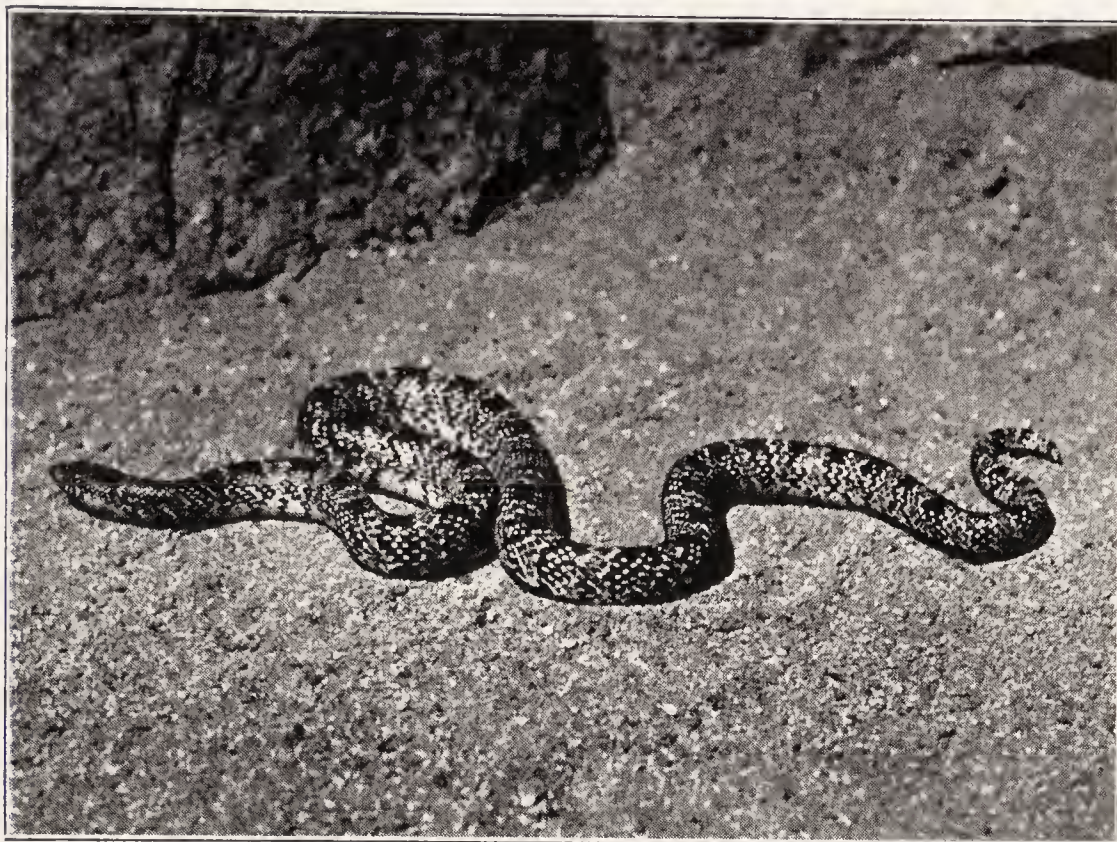
A word might be said about the capturing of harmless snakes. No matter how one goes about catching a Red Racer the probability of being bitten is high, but with the rest, I find that any attempt to grab the head of most of them results in a bite whereas if the snake is quickly but quietly picked up, not squeezed at all, but permitted to slide from hand to hand until placed in a snake-sack, few accidents occur. This is especially true of the King Snakes. Young snakes of all species are usually much more pugnacious than older ones. Even newly hatched babies of various species, barely out of the egg will rear back and lunge at a finger. Sometimes the intention to bite is obvious, but often the finger is struck by the closed mouth.



MOUNTAIN KING SNAKE

Lampropeltis zonata

This is the most beautiful snake in San Diego County. It is often called Coral King Snake and is moderately rare and found in the timber in the mountains. I believe we get more specimens from around Julian than any other one place. It is brilliantly banded with rings of red, black and white. The white rings are usually the same width all the way around, but the black and red vary a great deal; the red being often more or less absent on the latter part of the body. Specimens have been known to lack the red entirely in which case the Key would not work, and the snake might be confused with the Pacific Banded King Snake. However, on the Banded King the white (or yellow) bands are always much wider on the sides than on the back which is not true of this snake. Often someone comes into the Reptile House saying that he has killed a poisonous Coral snake. It is explained that this poisonous snake does not occur in California, and although known to be in several states East of the Mississippi, is found only in Texas, New Mexico and Arizona in the Southwest. Although both snakes are ringed with the same colors, the *order* of the rings is different. In the non-poisonous King Snake there is a black ring on each side of the white ring (twice as many black rings as white), the colors being in this order—red, black, white, black, red, etc. In the *poisonous Coral snake*, the order is red, white, black, white, red, etc. The food of the Mountain King Snake is lizards and very small mice. It may also eat snakes. Two feet is large, but specimens over 33 inches long have been taken.



LONG-NOSED SNAKE

Rhinocheilus lecontei

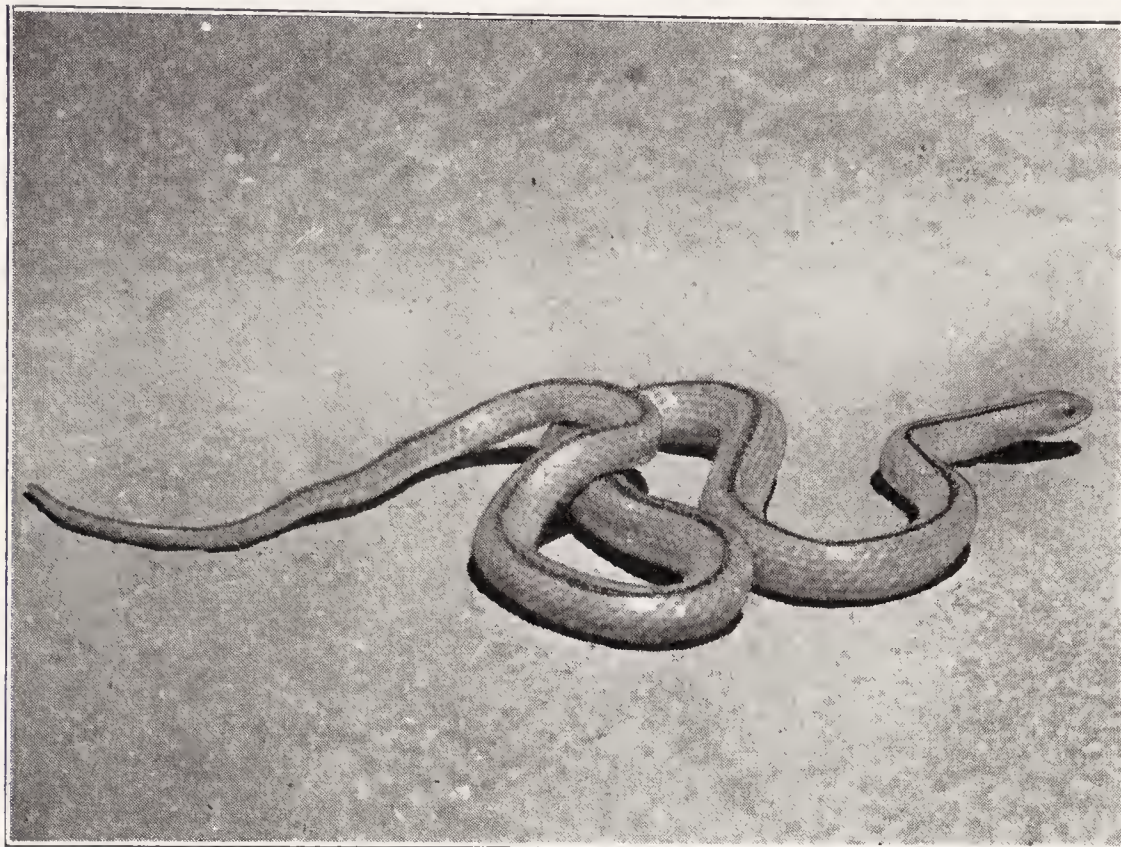
This is a very speckled snake. The upper surface has a series of dark brown or black blotches with intervening spaces of yellow and red. Except on the top of the back, the dark scales have light spots on them, and the light scales have dark spots. Sometimes, though rarely, the red is missing. With the long nose and the speckled appearance, I do not believe this snake should be confused with any other in San Diego County. It sometimes is, however, on account of the red, yellow, and black, but no other snake with these colors has such a speckled appearance, and the single row of plates under all or most of its tail will serve to identify it. It is moderately common throughout the County from the ocean to the mountains, but not above an altitude of about 4000 feet, being usually found in the brush. Large specimens are about two and a half feet long. The pupil of the eye is round. The food of this snake consists principally of lizards and small rodents, and I imagine that snakes are added to its bill of fare. The young are hatched from eggs. Although it ranges as far away as Kansas, it was first taken in San Diego County. The Long-nosed Snake is crepuscular, preferring the dusk to the daytime. As is the case with all the nocturnal or crepuscular snakes, it is often captured in the daytime by turning over boards, stones, fallen signs, and anything else that lies flat, or nearly so, on the ground. Some species of snakes can be caught by prying off the flakes or cap rocks from the granite boulders.



SHOVEL-NOSED GROUND SNAKE
Sonora occipitalis

This is a nocturnal snake of small size. Ten or eleven inches is quite large, although record breakers come as long as sixteen or seventeen inches; most specimens are no larger around than a lead pencil; the tail is short and quickly tapers to a point. It is found only in the desert, where it is common. It is a pretty snake, the top surface being yellow or cream with black bands; between the bands there is usually a half-band of orange-red. The under surface of the tail is crossed by the dark bands, and farther toward the head the belly is sometimes marked with blackish bands that usually coincide with the dark ones above. The upper jaw is flat and very protruding, giving the snake his common name. The under jaw fits up and inside the upper jaw so that nothing can get into the mouth while the snake goes burrowing through the sand—"Swimming through the sand," as someone has said. The pupil of the eye is round. The food consists of soft-bodied grubs, small scorpions, and possibly lizards and their eggs. The fact that this snake has yellow, black, and red in a more or less band-like pattern, suggests a Mountain King Snake, but a glance at the illustration shows how impossible it would be to confuse them. There is almost no similarity.

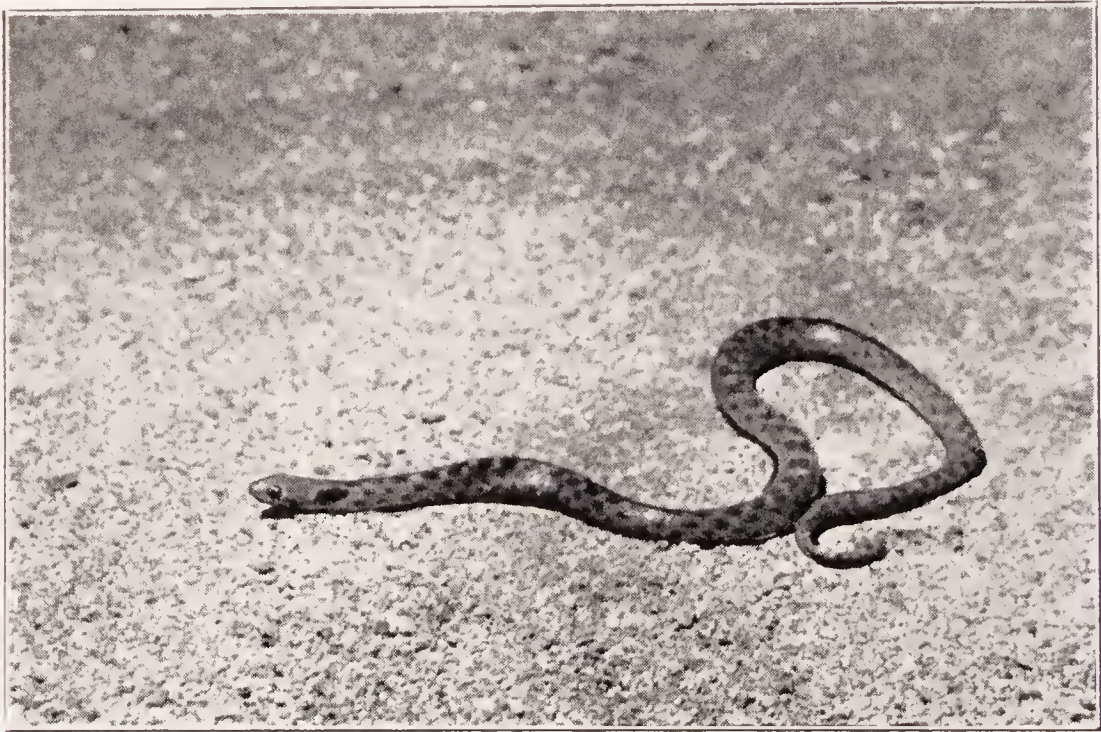
The Shovel-nose is a hot tempered little fellow, especially the younger individuals. Most specimens resent being handled and assume a defensive attitude when a hand is moved near them. They are quick to strike but as the teeth are too small even to catch in the skin, it is difficult to tell whether they try to bite or just hit with the mouth closed. However, the mouth is open and the intention is to bite. It seems to be true of most snakes that the younger they are, the worse tempered.



STRIPED GROUND SNAKE

Sonora episcopa

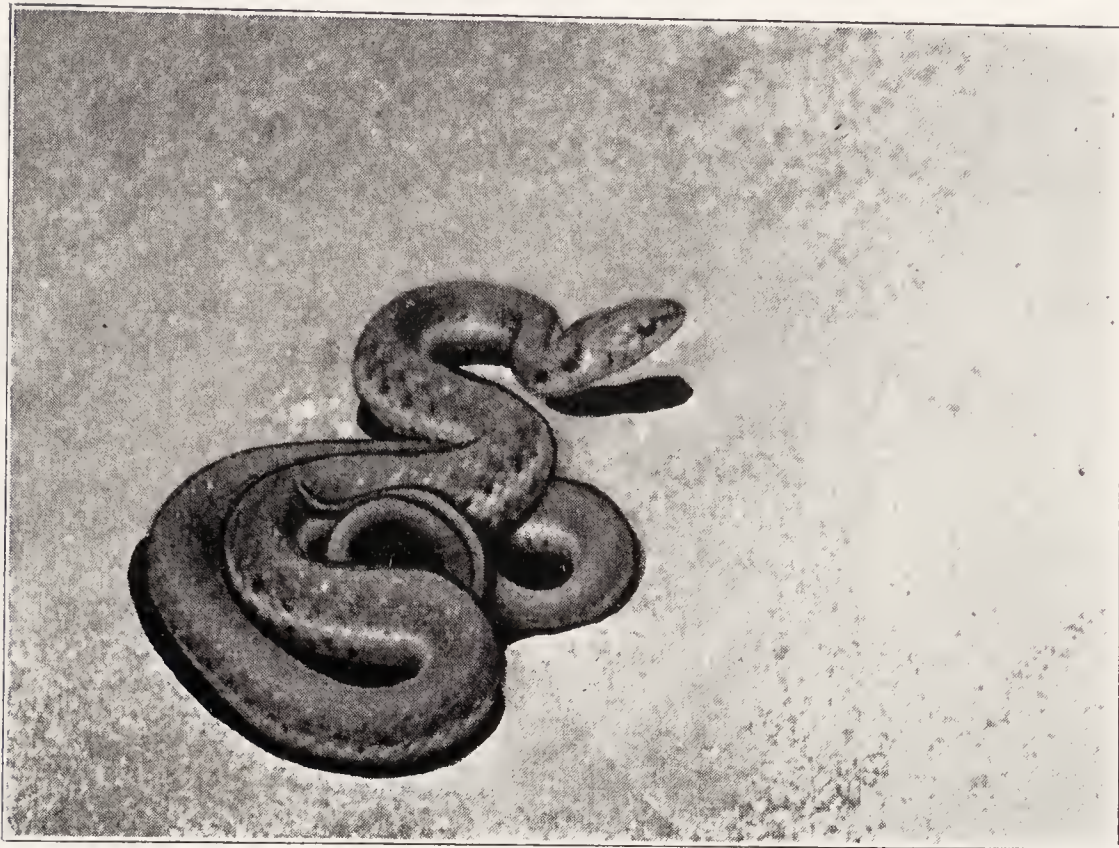
This snake is the same size and shape as the preceding one (except the head which is not shovel-like), but as its name implies, is striped instead of banded. Its color above gives the impression of a very light olive ground color with a red stripe covering from one to five scale rows down the middle of the back. Occasionally this stripe is missing. The food habits are presumably similar to those of the Shovel-nosed Ground Snake. The Striped Ground Snake is one of the rarest snakes in San Diego County, having been taken only at Carrizo, but as it is not particularly rare in Imperial County, it might be taken in Borego Valley, although it prefers more moist places. We are always thankful for any reptile brought to the San Diego Zoo, but especially for specimens which may extend the present known range, and thereby be of great help in the mapping, classification, etc., of the reptiles of our county. Should the Striped Ground Snake be captured any place in San Diego County, we would be very glad to get the specimen, and know the exact place, time and conditions of its capture. Small snakes are not often displayed in the Reptile House except in season as the feeding is quite a problem. Most of them are especially particular about what is eaten and to keep them through the winter would mean force feeding with some substitute for the natural food. Some species have been kept alive for long periods by opening the mouth and starting an earth worm or a meal worm down the throat. Often egg yolk from an eye-dropper is used. Usually an injury to the mouth occurs and the specimen is lost in a short time.



SPOTTED NIGHT SNAKE

Hypsiglena ochrorhynchus

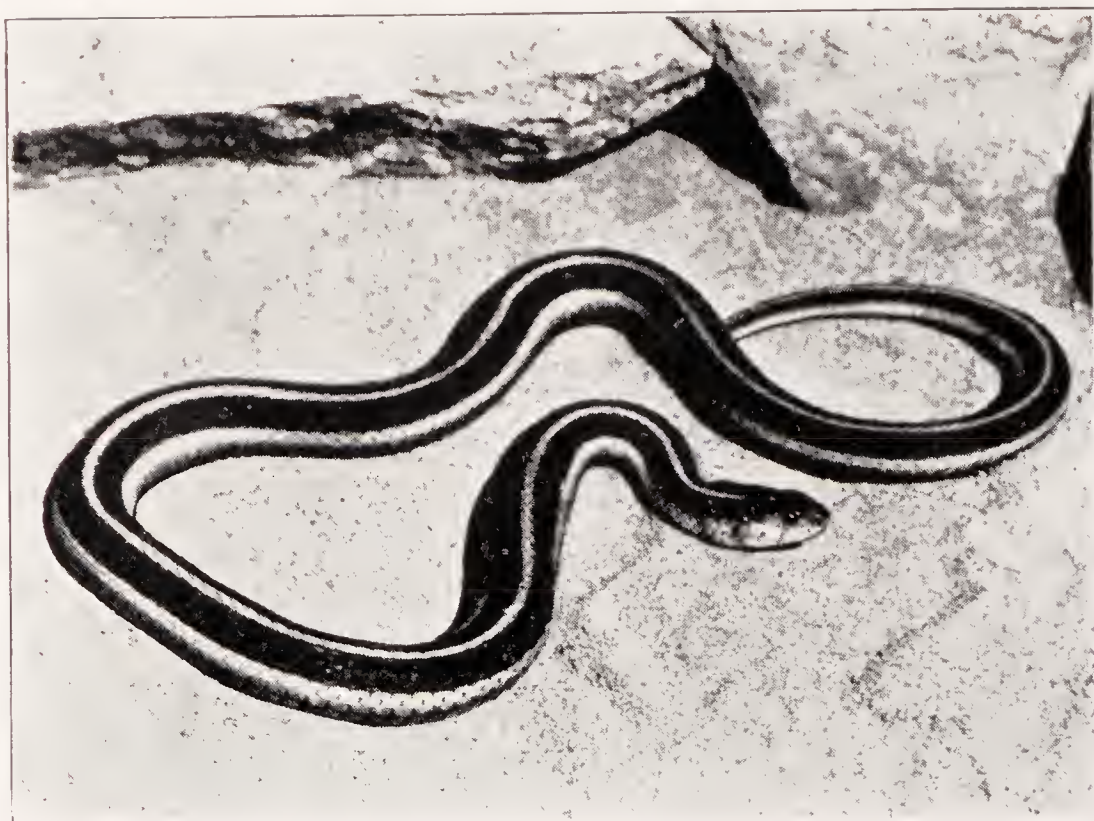
This small snake is yellowish above, covered with so many brown specks as to give it a light brownish appearance. There are several rows of small brown blotches along the back and sides; the larger blotches are along the back, usually in two rows. There is a much larger brown spot on each side of the neck. The belly is yellowish or whitish without markings except occasionally specks of brown under the tail. A large specimen is sixteen inches in length, though most individuals are less than a foot. It is a nocturnal snake with an elliptical pupil. Usually taken under rocks, it is found from the ocean through the mountainous regions down to the desert itself. Its food consists of lizards, grubs, etc. It is moderately rare in San Diego County, although we get several each year. It was first described from a specimen taken near Cape San Lucas at the tip of Lower California. We received three specimens from there in May of 1933, and were astonished to learn that the natives consider it one of the most deadly snakes, although there are three different species of rattlesnake at the Cape. It may seem to us surprising that such an absolutely harmless snake could be mistaken for a dangerous one. In other words, we are unable to believe that the natives could know so little about their own snakes, but we are really not much better. A few years ago I put our common Southern California Garter Snake in a cage in the Reptile House, with a paper and pencil, requesting those who thought they knew the snake, to write down its name. Five correct names out of fifty-one written, was the unbelievable result.



SOUTHERN CALIFORNIA GARTER SNAKE

Thamnophis ordinoides hammondi

The race each year for first place as the most common snake in San Diego County is between this snake and the San Diegan Gopher Snake, with the honors usually going to the Gopher Snake. The Garter Snake is found in almost any permanent stream or pond from the ocean to the desert foothills. The upper surface is dark with no central stripe. The side stripes are yellow and not always distinct. Above these stripes is a series of black squarish spots with yellowish spots between. Specks of white are found in both yellow and black spots. This side coloring is almost unnoticeable in old specimens, except when distended with food. The belly varies from dull yellow to dull orange-red. There being no stripe down the back, at once removes all chance of confusing this snake with the succeeding garter snake, and the head shape and presence of some pattern, however indistinct, separates it in looks from the Yellow-bellied Racer. None of the snakes in San Diego County except the two garter snakes has a red tongue with a black tip. The Garter Snake is never far from water, into which it dives at the first sign of danger. If not caught before entering the water, the chances are in favor of the snake, which swims to the bottom or behind a clump of plants, and remains perfectly still until the search is abandoned. The pupil of the eye is round as it is in all the garter snakes. Specimens longer than forty inches have been taken, but usual garters are very much shorter—two to two and a half feet.



PACIFIC GARTER SNAKE

Thamnophis sirtalis infernalis

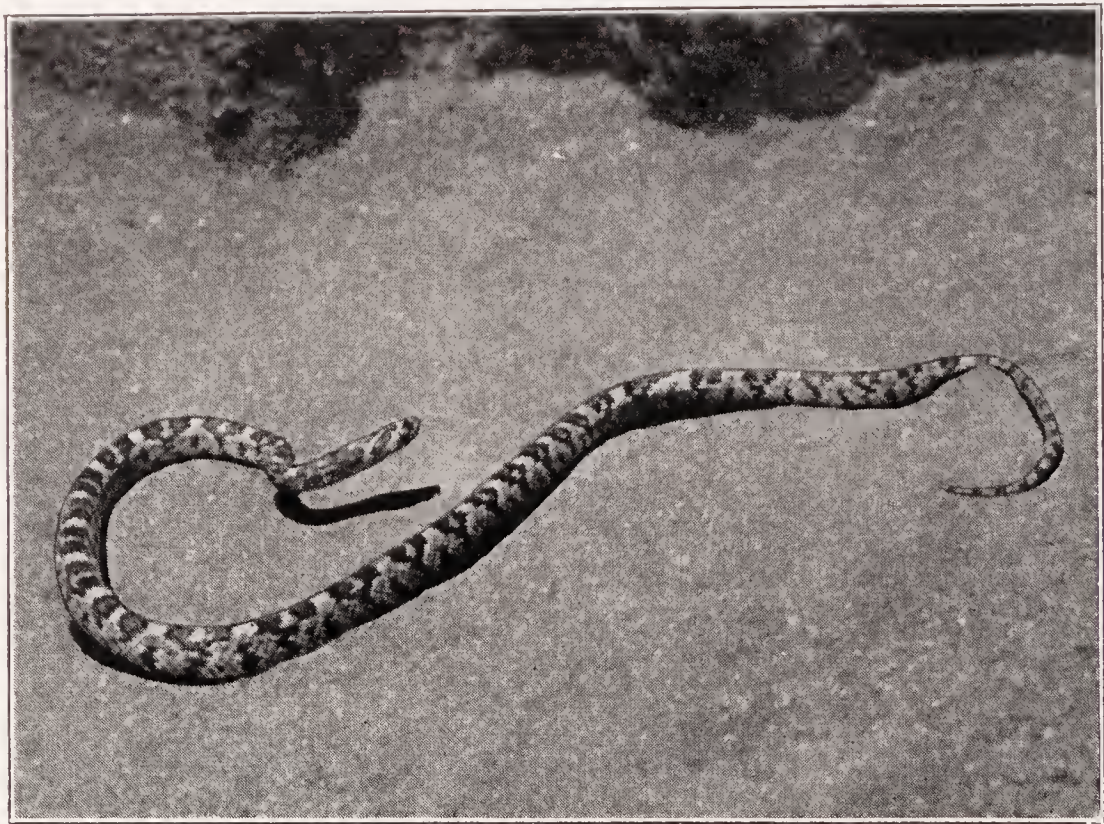
Individuals of this species differ so much in the details of coloration, that it would be impossible to describe them all. Most Pacific Garter Snakes found in San Diego County will be colored as follows: There is a yellowish line down the middle of the back, and a line of about the same color, or sometimes bluish, along each side on the second and third rows of scales. The belly is bluish or sometimes even the color of the side lines which makes the snake appear to have only one stripe—the one on the middle of the back. The color between the stripes is black with red bars going up from the belly; sometimes these bars are very prominent and sometimes are represented only by red skin between some of the black scales. It is a rare snake, in this County, all specimens having been taken in the northern part. Its food is almost entirely tadpoles, frogs, toads, and fish. The young snakes enjoy earthworms. Three feet is a very large snake, usual specimens are about two feet in length. When first caught, all of the garter snakes give off a very offensive odor which comes from a fluid expelled from glands through the anal opening. Once in captivity, this bad habit is forgotten, and the Garter Snake makes a splendid pet. Taking strips of fish when frogs are not available, makes them easy to care for, and a box of dirt with a pan of water in which to bathe is all that is required. The young are born alive. We have had females of different species of Garter Snakes give birth to as few as three, and to as many as fifty-three young at one time.



CALIFORNIA BLACK-HEADED SNAKE

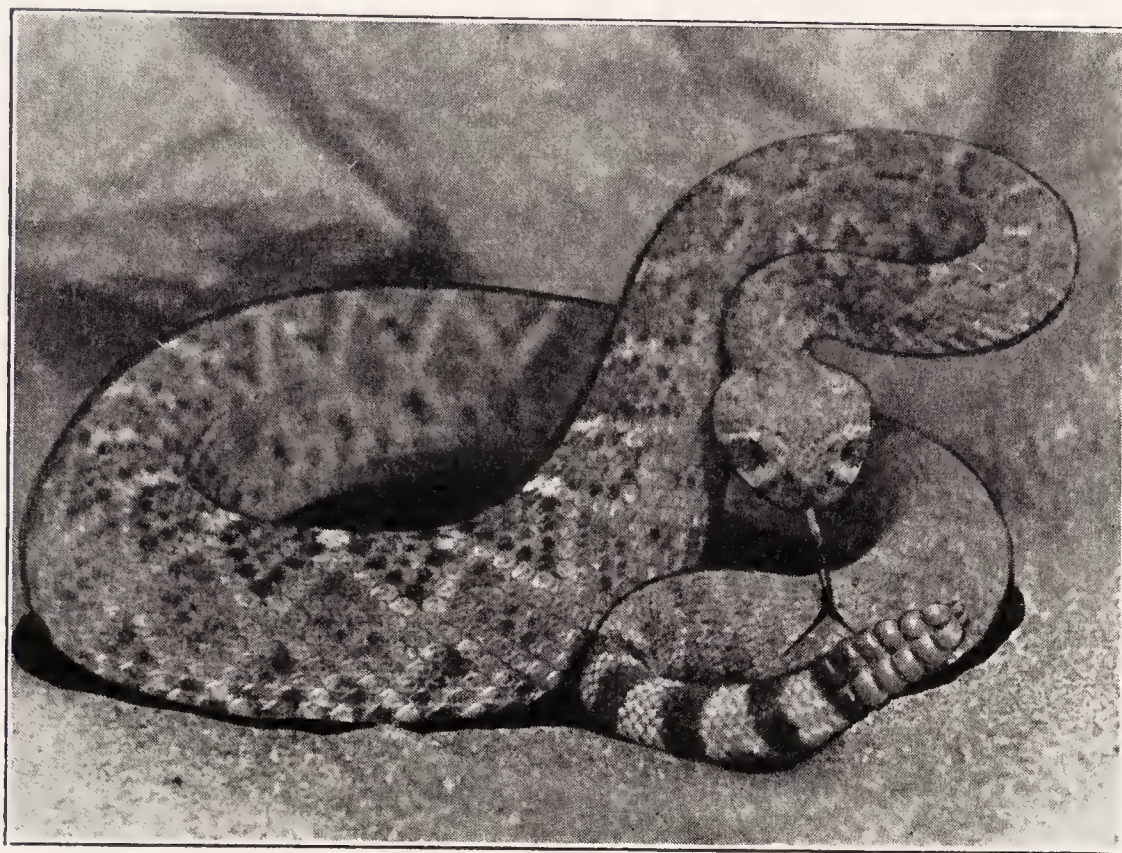
Tantilla eiseni

As its name indicates, this little grayish brown, or grayish pink snake has a black head, which is usually separated from the rest of the body-color by a whitish collar. The under-parts are pink, without spots. Twelve-inch specimens are large. Except in the high mountains, this burrowing snake is found from the ocean to the desert foothills. It is moderately rare, and usually captured under rocks, being very quick in its movements when its protecting covering is removed. The eye pupil is round. In the past, for some unknown reason, it was believed that the Black-headed Snakes, (Genus *Tantilla*) were poisonous, although due to small size and almost microscopic teeth, harmless to man. How this belief became common is hard to understand as the sectioning of the head when done at the Zoo Research Hospital shows no sign of poison glands. The Black-headed snake eats earthworms in captivity, and presumably includes the soft-bodied larvae of various insects in its diet. All of the small snakes and particularly the burrowing ones are hard to keep in captivity. They make poor exhibits because, if allowed to burrow they cannot be seen, and if kept visible, they do not do well. They require so much attention, that in a large collection of snakes such as we have in the Reptile House, they are seldom put on display except for short periods. This snake might be confused with the Ring-neck because both snakes have a collar, but the Black-headed Snake is one solid color underneath, whereas the Ring-neck has dark dots on a yellow or orange belly, and the under-tail is red.



CALIFORNIA LYRE SNAKE
Trimorphodon vandenburghi

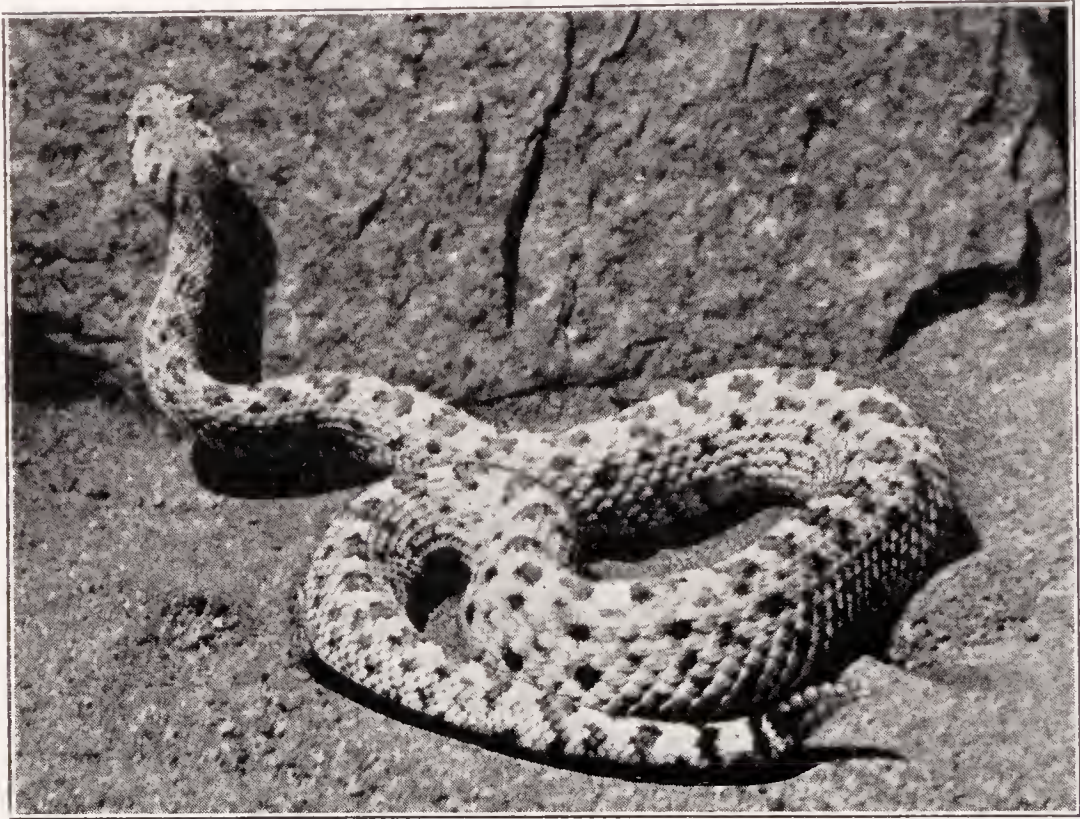
This moderately rare snake is light brown or gray, with brown blotches on the middle of the back, which are split in two by a light line, and has smaller blotches on the side. The under-parts are white with occasional dark markings on the edges of the belly plates. There is a brown mark, the shape of which suggests a lyre, on the gray head which is broad and very distinct from the neck. The eyes are large, having elliptical pupils. This is the only back-fanged snake in San Diego County. It is harmless to man, as a bite from its small teeth probably would not break the skin and should this occur, the poison might cause as much inconvenience as a mosquito bite, as it is too weak to kill a mouse. It is hard to believe that a person bitten would permit the snake to advance its jaws, with their characteristic chewing motion, far enough to imbed its fangs. Although occasionally captured at night in the open, it is more often taken in rock crevices or under granite flakes. It occurs from the ocean to the desert foothills. It feeds upon lizards and probably snakes, and in captivity has eaten small mice. The fact that the Lyre Snake uses two different methods to kill its prey, is interesting. I have seen its close relative, the Lower California Lyre Snake (*T. lyrophanes*), wrap around a mouse in true constrictor style, and I am sure the animal was not far enough back in the mouth to be reached by the poison fangs. Also the regular back-fanged method was used by the same snake, working its food (this time a lizard) back to the fangs by a chewing motion, and waiting for it to die. The young are hatched from eggs. It reaches a maximum length of between two and a half and three feet.



DESERT DIAMOND RATTLESNAKE

Crotalus cinereus

With this snake we start the description of the *only* dangerous snakes in California, the Rattlesnakes. This particular species is rare in San Diego County, only a few specimens having been taken, all in the neighborhood of Carrizo Springs. It might be found however, in Borego Valley as it is common in Imperial County. Although it occurs in light tan, pinkish, and cream, the usual color is grayish or brownish gray. The darker blotches down the back are often irregular instead of diamond-shaped, and the light margins do not always completely enclose the blotch. The tail coloration consists of black and white bands. Seven-foot specimens may exist but five to five and a half feet in length is very large. This snake might be confused with the Red Diamond Rattlesnake, as sometimes the Red Diamond is grayish and sometimes this one is reddish. This is true in few cases however. Also remember that the Desert Diamond is very rare and the Red Diamond is very common so the chances are that the snake in question is the more common one. The venom of the Desert Diamond Rattler is so toxic, and the amount injected so large, that it is probably the most dangerous snake in the United States. All rattlesnakes are killed by too much exposure to the direct summer sunlight, about ten minutes being long enough to cause death. It has been proven that it is the heat that kills, and not some photo-chemical reaction. When the body temperature of the snake reaches about 115° F., it dies. This usually means a sand temperature of above 135° F., and an air temperature of about 95° F.



SIDEWINDER

Crotalus cerastes

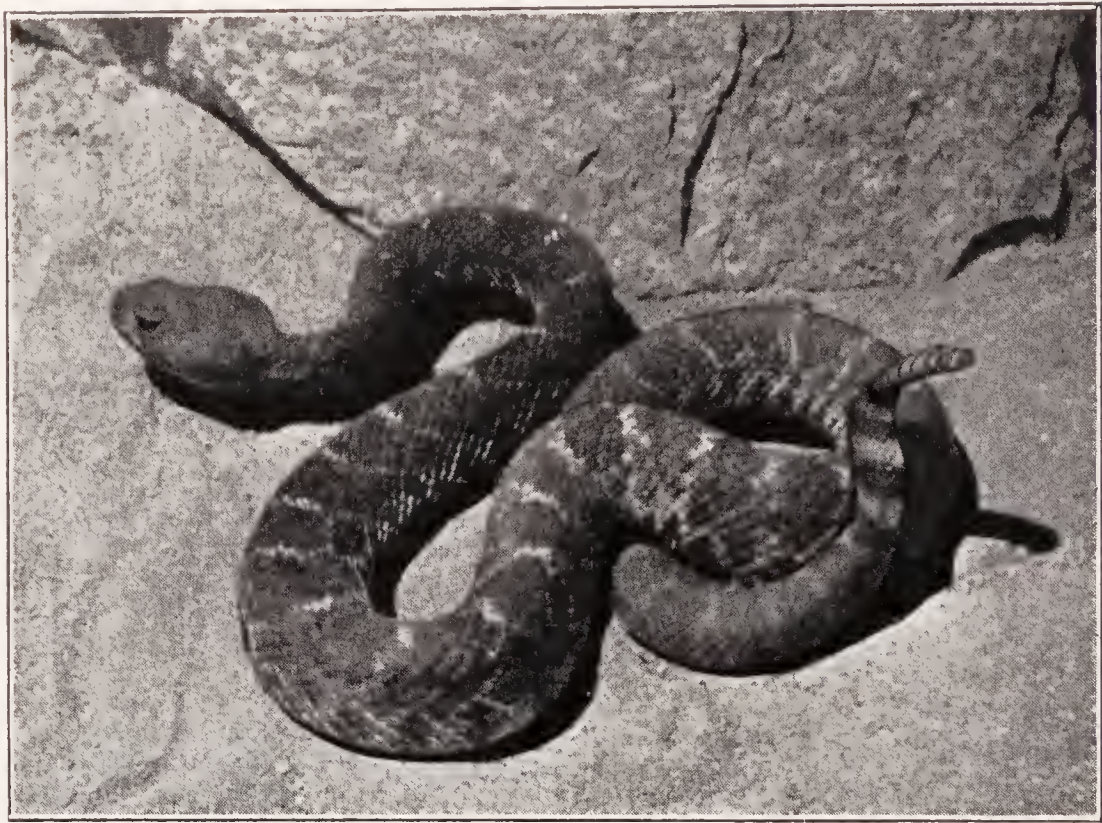
This small rattler is moderately common on the desert. It is nocturnal and often taken on the paved road in Borego Valley after dark. In the Spring, during April and May, many more are found than at any other time of the year. Few specimens are over two feet in length. The food of the Sidewinder consists of lizards and small rodents, wherein it differs from most rattlers, which usually take only warm-blooded animals, at least in the case of adults. The scales above the eyes are much enlarged, forming *prominent* horns, hence the name "Horned Rattlesnake" which is often applied to this snake. Its color is gray, or grayish cream, with band-like blotches of brown down the back. The name "Sidewinder" is taken from its unique method of locomotion. Part of the body behind the head, where one might imagine the shoulders should be, is pressed down and the body thrown forward, resting on what might be called the hips. These are pressed down, and the body again thrown forward, leaving a track of parallel unconnected lines. The head is pointed at an angle to the direction taken by the snake. In appearance, the snake seems to have a walking motion. This method depends upon pressing down on the sand and not pushing against the surface, which gives the snake better traction. That all desert snakes have not adopted this method of getting over the shifting sands is an unanswerable problem. This is the least dangerous of the rattlers in the county, but nevertheless is dangerously poisonous and should be avoided.



SPECKLED RATTLESNAKE

Crotalus mitchellii pyrrhus

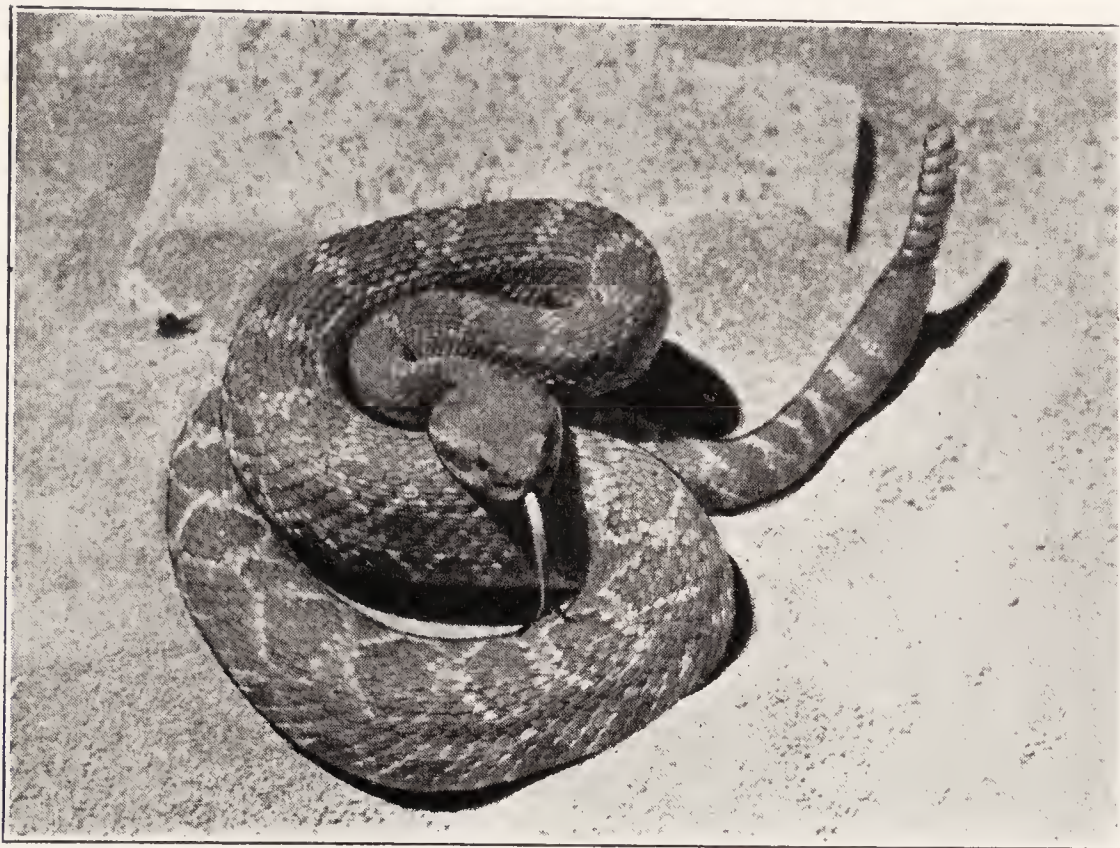
This snake is also called "Faded," "Bleached," and "Granite Rattlesnake." The color of the Speckled rattler varies a great deal, being gray, yellow, tan, pink, and black and white. The band-like blotches are very irregular in design with no very definite outlines, and the whole coloration gives a very speckled appearance. Not merely does it have the irregular speckled edges to the blotches as does the Desert Diamond Rattler, but is thoroughly speckled all over. The tail is black and white. The Speckled Rattler differs from the other rattlers in having small scales between the large nose plate at the front of the head, and the plates that contain the nostrils. In the rest of the rattlers, the nose plate is in contact with the nostril plates. A specimen four feet long is good sized. It is common from the foothills to the desert, usually in rocky country. The food of this snake, as well as that of the other adult rattlers in this County consists principally of rodents. The young of all probably eat lizards as well. In all rattlesnakes the young are born alive, the number varying from three or four in the case of the small species, to as many as twenty in the large ones. Six to twelve is the usual number. At birth they are provided with fangs and poison glands, and have a button on the end of the tail. The length is eight to twelve inches, and the markings are more or less like the adults. With the flat, wide head, and the button, it could not be confused with any of the small snakes, nor with the young of any other snake.



RED DIAMOND RATTLESNAKE

Crotalus ruber

This large rattler is found from the ocean to the desert foothills, except on the mountain tops. Its color is usually red with few noticeable markings except the white scales which outline the diamonds, and these are often indistinct, particularly on the sides. The tail is marked with black and white rings. It is the mildest tempered of our rattlers, and is often captured and put in a snake sack without rattling at all. It rattles less and hisses more than the other rattlesnakes. After a short time in captivity, it becomes so tame that it is often handled. This is a foolhardy practice by which nothing can possibly be gained to offset the inherent danger. The poison is lowest in toxicity of any of the North American rattlers, but the large amount of venom available makes it more dangerous than the Sidewinder, whose poison is slightly more toxic, although there is less of it. Snakes four and a half feet in length are very large, and a six-foot specimen has never been brought to the Zoo. It is hard to understand why the length of snakes is so often exaggerated. A four-foot rattler with its large head and heavy body is usually described as "a rattlesnake six or seven feet long, and as big as my arm." I would like to measure one of these while still alive, because I can't understand why I can't catch such a one! The Red Rattlesnake seems to come out of hibernation earlier than the Pacific by a week or so. However, both of them, over a period of time, are taken during all months of the year.



PACIFIC RATTLESNAKE
Crotalus viridis oreganus

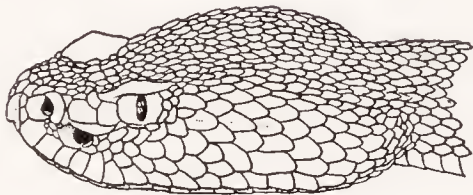
This is the most common rattlesnake in the County and is found from the ocean to the desert foothills, including the tops of our mountains. It has been taken at an altitude of 8,600 feet in the Sierra Nevadas and as high as 10,785 feet on Mt. San Jacinto in Riverside County. It also extends into Canada, being found farther north than any other rattler. The Pacific Rattlesnake covers so much territory, and varies so much in coloration, that several common names have been given to it. As the tail does not consist of black and white rings, and there are no horns over the eye, it would seem impossible to confuse it with other rattlers of San Diego County. The ground color is grayish or brownish, or almost black, with a series of squarish blotches usually of a darker shade, and edged with yellow, orange, or light brown. The young have a light stripe across the top of the head, which is missing in the adults. All rattlesnakes have eyes with elliptical pupils. A specimen three and a half feet long is good sized although extra large ones a foot longer are sometimes found. The Pacific Rattlesnake makes a great fuss when found in the field, and takes more work to capture than most rattlers, sometimes jerking about so much that several segments of the rattle are broken off. Some individuals continue their nervousness in captivity and do not do well; a few calm down quickly, and becoming splendid "feeders," live a long time.

KEY TO THE SNAKES OF SAN DIEGO COUNTY

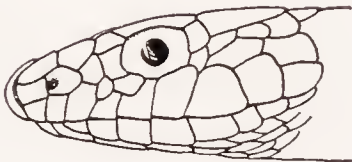
This key is so arranged that, by starting at number one, taking the correct "if" of the two alternatives, then taking the number on the right and proceeding in the same manner, the name of the snake will be found. The key must be started at the beginning and not at some other place where a phrase happens to fit the snake in hand, e.g., "if the pupil of the eye is elliptical."

The key is not infallible. It can be used *only* for snakes captured in San Diego County. There is such a great deal of variation in color, markings, etc., among individual snakes of the same species, that an error might occasionally be caused. But it is believed that, should this occur, the snake can be identified by using the key as far as possible, and then turning to the illustrations and descriptions of the snakes.

- 1. If the snake has rattles or a pit below a line drawn from the nostril to the eye..... 2
If not 6

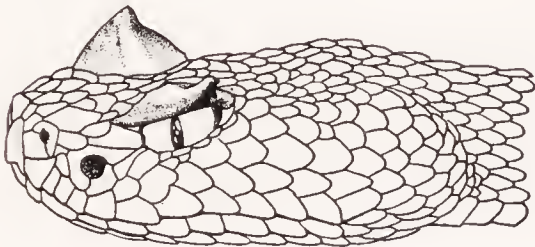


Pit below nostral-eye line

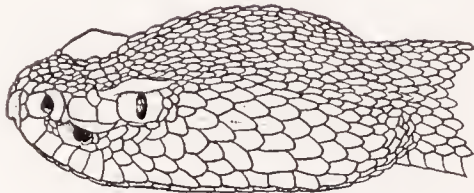


No Pit

- 2. If there is a very prominent horn over each eye and the snake was found on the desert—Sidewinder (Crotalus cerastes)Page 50
If not 3

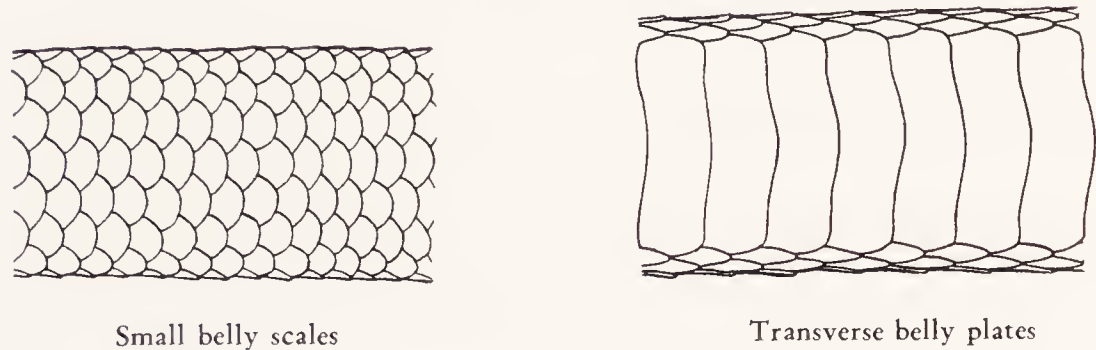


Prominent Horn



No horn over eye

3. If the blotches on the back have no definite outline
(some specimens have band-like blotches), giving
the snake a very speckled appearance—Speckled
Rattlesnake (*Crotalus mitchellii pyrrhus*) ...Page 51
If not 4
4. If the pattern of the tail consists of black and
white bands in strong contrast..... 5
If the tail pattern consists of bands of ground
color and a darker shade—Pacific Rattlesnake
(*Crotalus viridis oreganus*)Page 53
5. If the snake is a reddish color and found from the
ocean to the western edge of the desert—Red Dia-
mond Rattlesnake (*Crotalus ruber*)Page 52
If found on the desert and the color is grayish—
Desert Diamond Rattlesnake (*Crotalus cinere-
ous*)Page 49



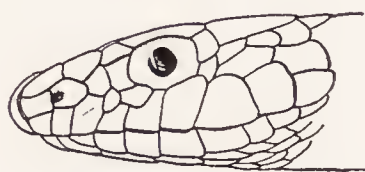
6. If belly scales are the same size as those on the back..... 7
If not—but the belly is covered by transverse
plates much larger than those on the back..... 8
7. If found on the desert and has five rows of moder-
ately dark scales on back—Desert Worm Snake
(*Leptotyphlops humilis cahuilae*)Page 24
If found west of the desert and has seven rows of
dark scales on the back—Western Worm Snake
(*Leptotyphlops humilis humilis*)Page 23



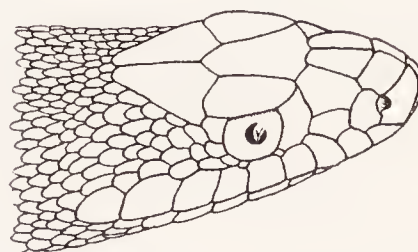
- 8. If there are small scales on top of the head—California Boa (*Lichanura roseofusca roseofusca*) Page 25
If not—but large plates instead 9
- 9. If the only pattern on the back is a collar on the neck..... 10
If not 11
- 10. If the yellow or orange belly is spotted with black and the under-tail is red—San Diegan Ring-neck Snake (*Diadophis amabilis similis*) *.....Page 26
If the belly is unspotted and the same color as the under-tail—California Black-headed Snake (*Tantilla eiseni*)Page 47
- 11. If the pattern on the back consists of cross bands 12
If not 16
- 12. If any of the bands completely encircle the body..... 13
If not 15
- 13. If the bands encircle the body from the neck to the tail 14
If the black bands encircle only the latter part of the body, but the forward part of the belly is unmarked—Shovel-nose Ground Snake (*Sonora occipitalis*)Page 42
- 14. If any of the bands are red—Mountain King Snake (*Lampropeltis zonata*)Page 40
If not—Pacific Banded King Snake (*Lampropeltis getulus californiae*)Page 39

*One specimen of the Los Angeles Ring-neck Snake (*Diadophis amabilis modestus*) has been taken in San Diego County at San Onofre. More probably will be discovered in the northern part of the county in the future. See under Description of Snakes for difference between the San Diego Ring-neck and the Los Angeles Ring-neck Pages 26, 27

15. If the bands are of red, yellow and black and have a very speckled appearance (the red sometimes is missing on specimens from the desert side of the mountains)—Long-nosed Snake (*Rhinocheilus lecontei*) Page 41
- If the pattern is red and black cross bands on a light colored snake (the red is sometimes missing)
—Shovel-nosed Ground Snake (*Sonora occipitalis*) Page 42
16. If the back pattern consists of one or more stripes.....17
If not 23
17. If the stripes are on the sides only.....18
If there is a stripe down the middle of the back.....19
18. If the back between the stripes is solid color and the stripe is on the third and fourth rows of scales
—California Striped Racer (*Coluber lateralis*) Page 31
- If there is any design, however indistinct, between the stripes which are on the second row—Southern California Garter Snake (*Thamnophis ordinoides hammondi*) Page 45
19. If there is more than one color between the middle stripe and the side stripes (if any) —Pacific Garter Snake (*Thamnophis sirtalis infernalis*) Page 46
If not.....20
20. If the stripe is red on a greenish back ground—
Striped Ground Snake (*Sonora episcopa*)Page 43
If not.....21



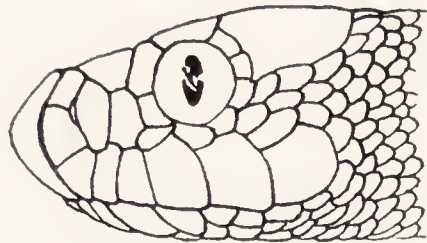
Nose-plate like a patch



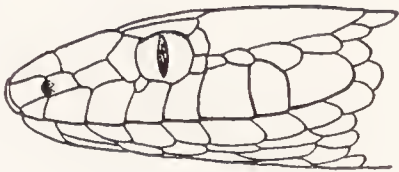
Normal nose plate

21. If the scale on the nose looks like a patch with free lateral edges.....22
If not—California Striped King Snake (*Lampropeltis getulus californiae*)Page 38

22. If the snake was taken on the floor of the desert and the stripe is more than one scale and two half scales wide—Desert Patch-nosed Snake (*Salvadora grahamiae hexalepis*) Page 33
 If taken west of the desert — Chaparral Patch-nosed Snake (*Salvadora grahamiae virgul-tea*) Page 32
23. If the head and back are the same solid color without design of any kind..... 24
 If not.....25
24. If the back is olive or grayish-brown and the entire undersurface bright yellow—Yellow bellied Racer (*Coluber constrictor mormon*) Page 28
 If the back is solid black—Black Whip Snake (*Coluber piceus*) Page 30
25. If the head is black or dark brown..... 26
 If not..... 29
26. If the head and neck are black or dark brown and the rest of the back is a different color, often reddish — Red Racer (*Coluber flagellum frenatum*) Page 29
 If only the head is black or dark brown but the neck is not27
27. If the neck is the same solid color as the rest of the back—California Black-headed Snake (*Tantilla eiseni*) Page 47
 If the neck and forepart of the back is mottled or cross-banded but the latter part of the back is unicolor28
28. If the under surface of the lower jaw is marked with small dark spots—Juvenile Red Racer (*Coluber flagellum frenatum*) Page 29
 If unmarked — Juvenile Yellow-bellied Racer (*Coluber constrictor mormon*) Page 28
29. If there are band-like blotches of red, black, and yellow with a very speckled appearance (the red is sometimes missing on specimens from the desert side of the mountains) — Long-nosed Snake (*Rhinocheilus lecontei*) Page 41
 If not.....30

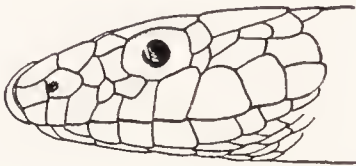
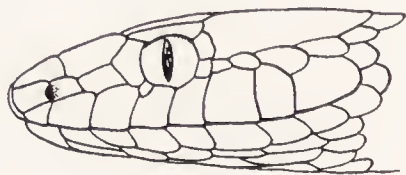


Leaf-nose



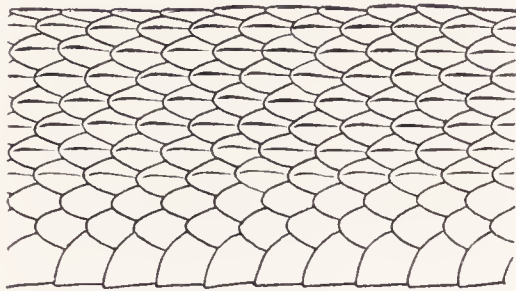
Normal nose plate

30. If the scale on the end of the nose is very large and looks pasted on—Leaf-nosed Snake (*Phyllorhynchus decurtatus perkinsi*)Page 34
If not.....31

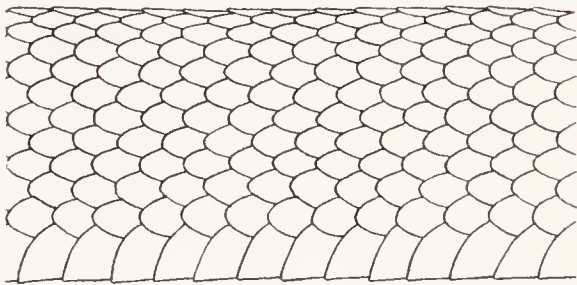


31. If the pupil of the eye is elliptical.....32
If not.....33

32. If the head is crossed by a more or less distinct gray or brown band which makes a design somewhat like a lyre—California Lyre Snake (*Trimorphodon vandenburghi*)Page 48
If not—but there is a large brown blotch on each side of the neck—Spotted Night Snake (*Hypsiglena ochrorhynchus*)Page 44



Keeled or rough scales



Smooth—not keeled

33. If the scales are keeled.....34
If not.....35
34. If found on the floor of the desert—Desert Gopher Snake (*Pituophis catenifer deserticola*)Page 37
If found west of the desert—San Diegan Gopher Snake (*Pituophis catenifer annectens*)Page 36

35. If the design is the same from the head to the tail — Western Glossy Snake (*Arizona elegans occidentalis*)Page 35
If the forward part of the back is blotched or banded but the latter part unicolor.....36
36. If the under surface of the lower jaw is marked with small dark spots—Juvenile Red Racer (*Coluber flagellum frenatum*)Page 29
If unmarked — Juvenile Yellow-bellied Racer (*Coluber constrictor mormon*)Page 28

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